Promoting Community Bushfire Preparedness:

Bridging the Theory – Practice Divide

by

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Publications and Statement of Co-Authorship

Paper 1:

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Abstract

The present study adopts a mixed-methods action research approach to examine the validity of a model developed to predict adoption of bushfire preparedness measures, and to subsequently apply the motivational factors found in this model to develop more effective and sustainable community bushfire preparedness initiatives. The research focuses on how individual, social, and societal factors interact to influence the adoption of protective measures against bushfire hazards. The premise upon which the Social Attachment Model of Bushfire Preparedness (Model) is based argues that it is not perception of threat or information *per se* that determines action, but rather how residents interpret this in the context of experiences, beliefs, and expectations that are developed and enacted in their social environment. These influential social processes were thus integrated into the development and implementation of a fire agency community bushfire preparedness pilot. The goal of this pilot was to increase the adoption and sustainment of community bushfire preparedness behaviour.

The first component of the present study was therefore to develop and test the theoretical Model of bushfire preparedness to assess the underlying individual, social, and societal influences of preparing for bushfires. Data for this analysis were collected from questionnaires delivered to participants living in four bushfire risk areas in Tasmania, Australia (Bagdad, Binalong Bay, Fern Tree, and Snug). Findings demonstrated that individual, community, and agency components of the Model interact to influence residents' decisions to adopt bushfire mitigation strategies.

The second component of the study utilised qualitative data obtained from telephone interviews with a sample of 34 residents living in the four target areas. Thematic analysis was used to elicit further insight into residents' bushfire preparedness decision making processes. These data were also used to validate the Model with major findings including the significant

influence of place attachment and responsibility on residents' decisions to prepare for bushfire.

The third component of the study involved the application of the Model to inform the development and implementation of a community bushfire preparedness program. The collaboration of the researcher with the Tasmania Fire Service's Community Development Officer, and the trialling of the Bushfire Ready Communities Tasmania Pilot (Pilot), provided an opportunity to conduct action research to determine how the Model findings could be practically applied to a bushfire preparedness promoting community initiative. This action research therefore bridges the theory-practice divide that commonly plagues hazards research.

The efficacy of the Pilot, and the value of the applied model findings, was evaluated by collecting data from feedback surveys, focus groups, and interviews with participating residents. Longitudinal qualitative data obtained from re-interviewing the original 34 participants following their participation (or not) in the Pilot activities, provided data on the long-term benefits and sustainability of its initiatives.

The findings indicate that developing community bushfire preparedness programs based on community engagement and empowerment principles results in more effective, sustainable, and economical ways of delivering preparedness education to communities. By utilising a community engagement approach, residents were more receptive of bushfire protective information and more likely to adopt these measures as information provided was more specific and contextualised, and communicated in a manner eliciting 'shared responsibility'.

Overall, the findings indicate that the conceptual Social Attachment Model of Bushfire Preparedness can be successfully applied to develop and implement more effective

community bushfire preparedness initiatives. These findings have important implications for emergency management agencies who wish to employ more effective community engagement strategies, and for communities themselves who aspire to increase the collective bushfire preparedness of their communities.

The thesis concludes with the caveat that for positive outcomes of these community engagement programs to be realised, fire agencies need to first realise the potential of community engagement principles to foster community bushfire preparedness, ensure that these messages filter down to their volunteer fire brigades (who represent the front line of this 'dual process community engagement approach'), and provide support and training to the volunteer fire fighters to ensure that the effective implementation and sustainment of these initiatives are achieved. If these feats are realised, community bushfire preparedness, fostered through the reciprocal and complementary relationship between the community and the fire agency, will ensure that these measures are sustained and resilience to future hazards promoted.

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Jeg elsker dig.

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Chapter One

Bushfires[1] represent one of the greatest environmental threats in Australia. Indeed Australia is widely regarded globally as one of the most fire prone continents in the world (Rohrmann, 1999; Webster, 1986). The 2009 Victorian Black Saturday bushfires gained the infamous title of Australia's worst natural disaster in recorded history, claiming the lives of 173 people. This was a devastating reminder of just how susceptible Australia is to relatively sudden-onset bushfires and the need for household, community, and society preparedness to confront events that may give little warning. Bushfires have always and will continue to be a part of the Australian landscape. As with other countries of the world, Australia has evolved with fire and it thus plays a vital role in the regeneration of native flora and fauna (Beringer, 2000). As such, the climate, vegetation types, and ignition sources indigenous to Australia ensure that fire is inevitable (McGee & Russell, 2003). However, while the flora, fauna, and indigenous populations have demonstrated a capacity to adapt, this is less true for more contemporary residents. Not only has this proved problematic in the past, but it is likely to become more problematic in the future.

Due to population growth and, particularly, expansion into peri-urban areas (urban/bush fringe), the risk to people's lives and livelihoods posed by bushfire is increasing. This risk is compounded by the effect of climate change on increasing Australia's susceptibility to droughts and higher than average temperatures (Whittaker & Mercer, 2004). One consequence of this is the risk of bushfires occurring in areas where modern societies have no previous experience. Therefore, not only is the occurrence of bushfires increasing, but due to the increased

[1] The natural hazard phenomena of bushfires are also referred to as wildfires or forest fires by other research.

probability of this natural process interacting with the built and human environment, the potential for negative consequences is also increasing. It is this interaction that influences the potential of the natural phenomenon of bushfire becoming a disaster and thus provides justification for the present research attention.

Not only is it inevitable that the rate of bushfires will increase, but the uncontrollable and unpredictable nature of bushfires makes managing their likelihood challenging. Since risk is a function of the likelihood of an event happening and the consequences of that event (Bradbury, 1989), it becomes important to devote attention to managing the potential consequences of bushfire. This can be done in several ways: planning, mitigation, and preparedness.

Land use planning can prevent people living in at-risk areas. However, in many areas this is not an option as high levels of residential and commercial development has already occurred. This is true of the areas that will be the focus of this thesis. In areas where development has occurred, mitigation and preparedness become the strategies of choice.

Mitigating the negative consequences of bushfires has become a key goal of fire agencies. Mitigation activities eliminate or reduce the probability of a natural hazard becoming a disaster and help to minimise the negative consequences (Jakes, Kruger, Monroe, Nelson, & Sturtevant, 2004). Mitigation measures undertaken by fire agencies include physical (e.g., controlled burning, creating fire trails), structural (e.g., development of fire retardant building materials, building standards), and risk communication (e.g., preparedness information, warning delivery). The other strategy platform available involves helping people to manage their own risk. This moves risk management into the realm of preparedness and focuses on increasing

individual householders' capacity to prepare for, cope with, and recover from negative bushfire consequences. Therefore, increasingly, the efficacy of promoting individual bushfire preparedness is being realised due to the recognition that fire agencies' capacity and resources to mitigate bushfire hazards is limited (Enders, 2001; Rhodes, 2003).

A fundamental component of comprehensive bushfire risk management strategies is thus promoting household preparedness and, because of the unique way bushfire risk arises, community or collective (e.g., neighbourhood) preparedness. The nature of bushfire risk means that the safety of communities' residents relies on their neighbours and other community members preparing. For example, a neighbour's stand of eucalyptus trees may pose a significant bushfire risk to their other neighbours. Furthermore, by being prepared themselves, individual community members can offer assistance to other residents in preparation for and in the event of a bushfire in their area. The need for collective action is further highlighted by bushfire hazards' unique characteristic of communities actively choosing to live in bushfire prone areas, due to residents' attraction to living in close proximity to the natural environment.

Household and community preparedness encompasses the physical activities (e.g., removing trees overhanging house and roads, deciding on community safe area, clearing ground fuels and dry vegetation, storing of food and water) and psychological processes (e.g., deciding on an emergency plan, practicing this plan, considering how one might feel and act in a disaster, discussing with neighbours their plan, having phone numbers of neighbours), that allow residents to respond in a timely and effective manner, to protect themselves and their household in the event of a natural hazard. Not only does preparing limit the short and long term effects of

natural hazards but it may prevent the natural hazard from becoming a disaster. Furthermore, collectively preparing for bushfires will ensure that communities' capacity to cope with and resilience to future hazards is also promoted.

Promoting community-wide preparedness, through targeting its foundational components, the individual householder, is recognised as one of the most effective ways of mitigating natural hazards (e.g., AFAC, 2010; VBRC, 2010). Encouraging individuals to prepare for natural hazards has thus become key business for emergency management agencies. However, as the continued and increasing occurrence of bushfire disasters testify, people still do not adequately prepare for bushfires (Childs, Pritchard, Gow, & Hastings, 2006; Enterprise Marketing and Research Services, 2010; Eriksen & Gill, 2010; Paton, Bürgelt, & Prior, 2008). As a result, identifying why people do not prepare and the social processes that influence people's decisions to prepare have become essential questions of hazards research. Consequently, the primary focus of the present study is to determine what influences people to adopt household preparedness measures, and how this adoption can be promoted.

1.1 Statement of the Problem and Aims of the Present Study

Despite the efforts of emergency management agencies to make information about bushfires and how to deal with them available to the public, the goal of ensuring sustained levels of bushfire preparedness has remained elusive. People living in bushfire prone areas continue to demonstrate a reticence to adopting preparedness measures (Childs et al., 2006; Enterprise Marketing and Research Services, 2010; Eriksen & Gill, 2010; Paton, Bürgelt, et al., 2008). This questions the effectiveness of fire agencies' risk communication and education strategies (Lindell & Whitney, 2000).

The traditional approach to pursuing this goal has been based on the assumption that providing people with information regarding hazard risk and protective measures will automatically lead to them adopting these measures. In this top-down approach the recipients of the information are viewed as passive receivers of the hazard risk information and recommendations rather than active participants (Murphy, 2007). Although risk perception and hazard awareness may increase as a result of the presentation of hazard and preparedness information, providing the public with hazard risk information does not automatically lead to increased preparedness (Davis, Ricci, & Mitchell, 2005; Lindell & Whitney, 2000; Paton, Smith, & Johnston, 2000; Rohrmann, 2000). The reasons for this are many.

The fact that many people fail to adopt the recommended preparedness actions calls for a critical reappraisal of this assumption and additional investigation into the preparedness process (Siegrist & Cvetkovich, 2000).

Recent studies (e.g., Lion, Meertens, & Bot, 2002; Morrissey & Reser, 2007) suggest that information programs that emphasise the probability, salience, and

magnitude of a natural hazard, without providing specific information about what to do in such an event, are likely to result in the targeted audience disengaging from the information material and not adopting preparedness activities. Problems can arise if recipients do not believe that information is meaningful (Anderson-Berry, 2003). As such, it is not information *per se* that determines action, but rather how people interpret it in the context of their beliefs, experiences, and expectations (McIvor & Paton, 2007). As a result, these perceptions may be very different from those of experts' objectively rational minds. Residents do not make 'wrong' decisions, but rather simply reflect fundamentally different reasoning processes from those of experts.

What constitutes a threat is a product of individual perceptions rather than attributes of risk, suggesting additional interpretive processes act to influence this perception (Sjoberg, 2000; Weinstein & Lyon, 1999). This therefore renders the content and quality of the hazard risk and preparedness information irrelevant. Due to the complexity (e.g., how bushfires behave, how to prepare for them) and uncertainty (e.g., unpredictable, uncontrollable, residents' limited experience) surrounding bushfires, how this information is interpreted and what influences this interpretation is what is important. As a result, risk communication strategies cannot begin to be effective unless they accommodate the social and cognitive influencers of residents' hazard interpretation (Paton, Smith, & Johnston, 2000).

As well as being affected by individual cognitive processes, such as cognitive biases and cost/benefit analyses, how people interpret and make sense of risk is influenced by their social environment. Risk and hazard perceptions are socially and culturally constructed, with different social groups attributing different meanings to potentially hazardous situations (Rohrmann, 1995). For example, Anderson-Berry

(2003) found that residents of a cyclone prone area were basing decisions not to prepare on folklore (i.e., mountains will offer protection from cyclones) and flawed beliefs (i.e., as reefs deter normal surge activity, the same would hold for cyclones). Similarly, Gregg et al. (2008) found that the cultural belief in Pele, the goddess of volcanoes and most widely known of Hawaiian deities, significantly reduced the likelihood of residents supporting bombing as a strategy for mitigating lava flow from destroying houses.

In order to understand how these cognitive and social influences affect individual natural hazard risk interpretation and resultant preparedness decision making, studies of recent years have turned to social cognitive models of human behaviour to explain how people interpret the information they are given and subsequently act on it (e.g., Mulilis, Duval, & Bovalino, 2000; Paton, Frandsen, & Johnston, 2010; Russell, Goltz, & Bourque, 1995; Solberg, Rossetto, & Joffe, 2010). The present study extends hazard literature by applying social cognitive theory to determine what individual and social factors influence decisions to prepare for bushfire.

As alluded to earlier, in the context of bushfires, it is imperative that the whole community is prepared to ensure the greatest opportunity for negating undesirable bushfire consequences. As a natural hazard, bushfires are unique because in the majority of cases people chose to live in the areas that are prone to their affects. This may be due to their attraction to the natural environment (and ironically the cause of the risk) or due to socioeconomic reasons such as being cheaper to live in peripheral areas. Residents' decisions about living in at-risk areas are therefore an important contextual factor. Recognition of this emphasises the need to include the social and societal context in research into how people construct their risk beliefs

and how these are, or are not, enacted through residents' bushfire preparedness decision making.

Articulating how social and societal mechanisms influence these processes must be included with the individual factors that are normally the focus of psychological studies of hazard preparedness. Exploring the interdependencies between individual, collective, and social processes therefore provides a novel contribution to natural hazards literature, and represents a crucial gap in the field to informing the development of more effective disaster preparedness education campaigns. Defining and addressing this gap is thus the first goal of this thesis.

It could be argued that an understanding of what promotes individuals' adoption of preparedness measures is relatively useless unless this knowledge can be effectively applied to facilitate change and increase preparedness. As such, the second aim of the present study was to determine how these social and cognitive factors, identified to affect people's decisions to adopt protective measures for bushfire, could be applied by a bushfire management agency to successfully promote and increase the adoption and maintenance of bushfire protective measures in at-risk communities.

In summary, the aims of the present study were to determine:

- How and to what extent do individual, community and social processes interact to influence how people develop and enact risk beliefs and preparedness actions?
- How can identified social and cognitive factors, demonstrated to effect individuals' decisions to adopt bushfire preparedness measures be utilised to develop more effective bushfire education programs?

The first component of the present study therefore presents and tests a new theoretical model of bushfire preparedness. Quantitative survey data was analysed using structural equation modeling to determine the fit of the theoretical model to a Tasmanian sample. A revised Social Attachment Model of Bushfire Preparedness is presented and qualitative data used to explain and validate the relationships between the factors in the Model. This mixed-methodology thus provides insight into what influences people to prepare for bushfires. This information was then applied using action research to develop and evaluate more effective community bushfire preparedness initiatives.

1.2 Overview of the Study

The introduction in Chapter Two will initially provide a background to the past and present bushfire situation in Tasmania. The bushfire history of Tasmania will firstly be presented, highlighting the major events of the 1967 and 2004 bushfires. The present and future bushfire risk, as determined and forecast by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) will be detailed to provide the motive for preparing for bushfires, followed by a summary of the current recommended protective measures for bushfire and the rationale for adopting these measures. The chapter concludes with an exploration of why people do not adopt protective measures, including a discussion of how cognitive biases and bushfire complexity may affect residents' preparedness decision making processes, and the issues surrounding traditional means of promoting bushfire preparedness and current forms of fire agency community education, is then presented.

Chapter Three provides a comprehensive discussion of the social cognitive models which are increasingly being adopted by hazards research to explain why people adopt, or do not adopt, measures to mitigate hazard risk. The Social

Attachment Model of Bushfire Preparedness is then introduced and applied as a theoretical framework for exploring what factors predict whether Tasmanian residents prepare for bushfires.

Chapter Four provides a rationale and detail of the methodology used in this research. It first introduces the merit of adopting action research and the efficacy of using mixed-methods to analyse the resultant data. Details are then provided of the quantitative and qualitative methods utilised in the study including a justification for the use of structural equation modeling (quantitative) and thematic analysis (qualitative).

Chapter Five presents the first component of the study which saw the distribution of the Bushfire Preparedness Questionnaire to residents living in four Tasmanian communities deemed at-risk of bushfires. The variables tested and measurements used are then discussed in detail. Reliability of observed variables and descriptive results are also presented.

Chapter Six tests the Social Attachment Model of Bushfire Preparedness on a sample collected from Tasmanian residents. The Model consists of generic variables of people's everyday experiences that influence the decisions they make especially when faced with uncertain life threatening events like natural hazards. Structural equation modeling (SEM) was utilised to test the measurement, structural, and revised Social Attachment Model of Bushfire Preparedness, with results indicating that the Model provided a good fit to the Tasmanian sample.

Chapter Seven presents the univariate analysis of between-community, and between-resident, differences that were conducted to demonstrate that although the Model can account for general processes of individuals' preparedness decision

making, every community and the residents within them are different and thus require more specific and targeted forms of bushfire education. The important findings of this chapter include gender differences in preparing for bushfires and the effect of previous experience on bushfire preparedness adoption.

Chapter Eight will further explore these differences by introducing a qualitative component to the study. The generic variables of the Social Attachment Model of Bushfire Preparedness will be further explored and validated by qualitative data obtained from interviews with Tasmanian residents living areas identified as being at-risk to bushfires. The qualitative component of the study will provide a greater understanding of the social and cognitive processes that influence people's decision to adopt bushfire preparedness measures and validate the Model identified in Chapter Six. By utilising a mixed-methods approach, the relationships and processes that were identified by the Model will be explored and explained in much greater detail, providing a more comprehensive account of why people prepare for bushfires and the differences in these motivators; information that will be invaluable for developing more effective bushfire education programs.

Chapter Nine introduces the applied, action research component of the study. The results of the Model tested in Chapter Six, the community and individual differences determine in Chapter Seven, and complementing qualitative interview data from Chapter Seven, will be applied to a community engagement program initiated by the Tasmania Fire Service. Chapter Nine will thus provide the details of the application of the theory derived from the present research to an actual education campaign, Bushfire Ready Communities Tasmania Pilot, aimed at increasing communities' ability to cope and recover from bushfires. This application will thus bridge the theory-practice divide that commonly plagues hazards research. This

chapter will also explore how the Pilot initiatives, by applying fundamental principles of determined by the Model, such as community engagement, adapt to the needs of the community, ensuring that pro-behaviour change is motivated and sustained through the empowering fire agency/community relationship.

This will be further demonstrated through the case study of the Middleton community and the Women's Bushfire Workshop trial presented in Chapter Ten. Through the application of action research, a bushfire preparedness initiative was tailored to a specific sample of the population, women, who were identified in an earlier component of the study to be significantly less prepared for bushfires.

Chapter Eleven presents the longitudinal component of the study through the reinterviewing of the original 34 telephone interview participants more than a year after the first interview. These data not only provides information about change in behaviour over time, a quality not possible with traditional cross-sectional designs, but also offers further evaluation of the efficacy of the Pilot, shedding light particularly on the sustainability of the approach. This longitudinal component of the study thus offers a unique contribution to the hazards literature and more realistic insight into what factors, over time, actually determine and influence whether people decide to prepare for bushfires or not.

Chapter Twelve introduces the notion that the positive effects of applying community engagement principles to foster community preparedness cannot be realised unless fire agencies acknowledge the efficacy of such ideas. Through telephone interviews with residents and engaging with communities during the action research component of the study, examples of community/agency relationships that did not foster trust and empowerment were presented. The

importance of studying these examples (both fire and non-fire agencies) is that it provides insight into why people still do not adopt bushfire protective measures, and allows mediation strategies to be incorporated into future community engagement initiatives.

Chapter Thirteen provides the general discussion of the thesis. Discussion topics include the important study findings of the influential role of place attachment and responsibility to others in influencing residents' bushfire preparedness decision making processes. This chapter also discusses how the action research component of the study bridged the theory-practice divide so common in the hazards research. A discussion of society's trend of disempowering its citizens, who in turn expect agencies to assume responsibility for hazard mitigation, is proposed to be a major obstacle for the success of future community engagement initiatives, and the preparedness of its residents. The chapter concludes with implications of and recommendations from the present research, as well as a discussion of its limitations and direction for future research.

Chapter Fourteen presents the conclusions of the present research and thesis.

Chapter Two – Background

2.1 Bushfires and the Tasmanian Context

Bushfires are a natural part of the Australian landscape (Beringer, 2000). In Tasmania, bushfires, of all the natural hazards, cause the most economic and financial damage. Tasmania's experience with major bushfire is infrequent, but when such events have occurred the results have been disastrous. Tasmania's most devastating bushfire, and one of Australia's worst, was the 1967 bushfire around the outskirts of Tasmania's capital city Hobart (see Figure 1). The 1967 Black Tuesday bushfires claimed the lives of 62 people, destroyed 1,293 homes, and burnt over 250,000 hectares (Emergency Management Australia, 2011). Most residents old enough to remember 1967 have vivid memories of either hearing about the bushfires on the radio, talking to friends affected, or have direct experience of the fires. For Tasmanian residents not old enough or living in Tasmania during 1967, stories from family, friends or neighbours who can remember the 1967 fires are often recalled when conversation turns to bushfires and preparing for them. The following extract from Collins (2006, p. 178) describes the fate of the town of Snug on the day of the Black Tuesday bushfire:

> Apparently named by a nineteenth-century ship's captain whose sick sailors recovered in the restful surroundings, the town of Snug in southern Tasmania quickly become a holiday destination for nearby Hobart. Wistful holiday-makers wrote to family and friends saying they were 'snug as a bug in a rug at Snug'. But by late afternoon on 'Black Tuesday', 7 February 1967, Snug belied its name. It lay in ruins. Eighty of its 120 houses were destroyed with only chimneys left standing. Also destroyed were two churches, two shops and a modern section of the local school. Eleven people were dead. More than half the town's population took shelter in the sea.

More recently, the 2006 East Coast fires (see Figure 1) have reminded Tasmanian residents of their susceptibility to damaging bushfire events. Although this fire did not directly claim any fatalities, the speed and ferocity of the fire left many who experienced it traumatised and with a new appreciation of their bushfire risk (personal communication with telephone interview participants; results of which are discussed in Chapter 8).

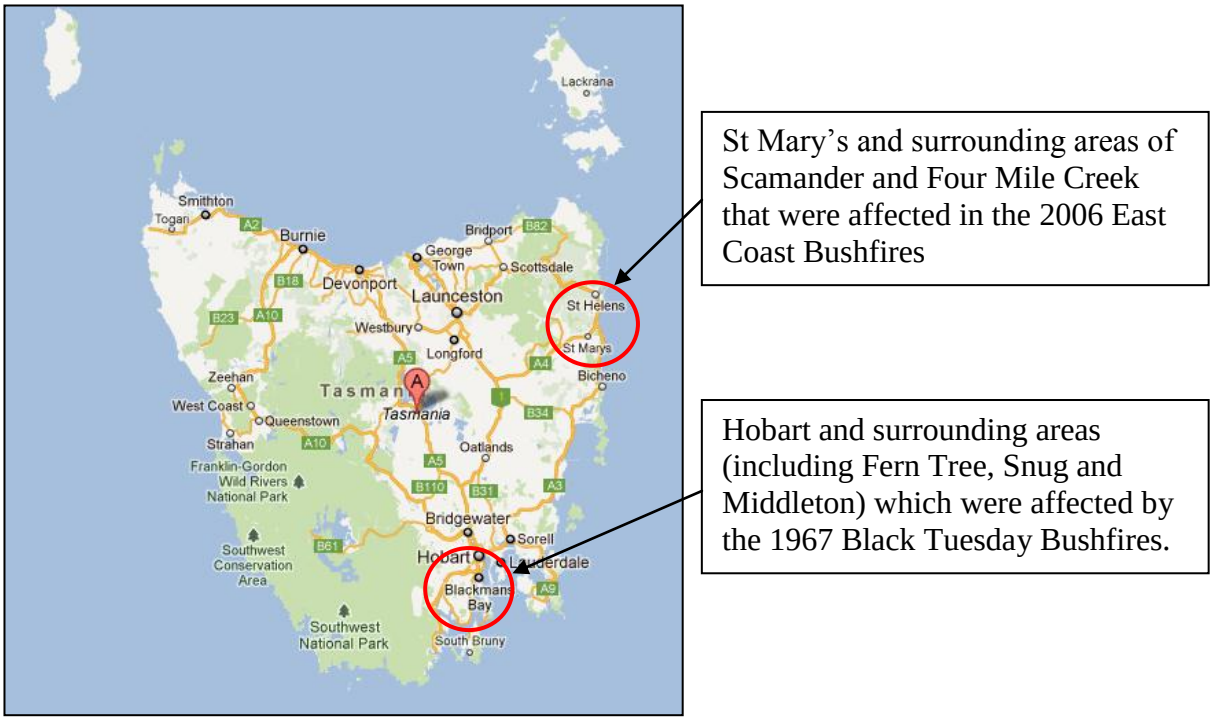

Figure 1. Map of Tasmania showing locations of 1967 Black Tuesday bushfires and 2006 East Coast fires (Tele Atlas, 2012).

As is illustrated by Table 1, bushfires are very much part of the Tasmanian landscape, and in more recent years, have been the cause of much environmental and infrastructure damage and loss. Although, fortunately, bushfires have not caused a fatality since 1982, this eventuality is inevitable due to the changing climate, population growth, and urban expansion into traditional bush settings.

Tasmania's extensive bushfire history, the potential for experiencing longer bushfire seasons, more intense and prolonged bushfires as a result of climate change (this will be discussed in the following section), and the continued migration of people into peri-urban interface areas, provides a cogent argument for studying how to reduce negative bushfire consequences in Tasmanian communities.

Table 1

Major Fire History of Tasmania from 1939 to Present

Year	No. of deaths	Area of fire (ha)	Losses	Location(s)
1939	-	9,600	Forests, orchards, pastures	Huon, Derwent Valley, West Coast Tasmania, King Island
1940	-	16,000	-	Hobart
1966–67 season	64	264,270	1700 buildings	Southeast, Hobart
1980	-	40,000	-	Launceston, Hobart, Zeehan
1981	-	?	6 houses	Pelverata, Bonnet Hill
1982	1	>40,000	-	Launceston, Hobart, Broadmarsh
1998	-	3,000	6 houses	Hobart's southern suburbs
2003	-	41,000	-	Flinders Island
2006	-	1,000	17 houses	Scamander, St Marys, Four Mile Creek

Source: Ellis, Kanowski, Whelan, (2004); Emergency Management Australia, (2011).

Additionally, due to Tasmanian residents' relatively infrequent exposure to life threatening bushfires (i.e., although fires occur on average every seven years, each locality and thus affected community is different), it makes Tasmania an ideal place to study bushfire preparedness, not only because of the inevitability of future disastrous bushfires occurring, but because this profile of high risk and relatively

high uncertainty (i.e., due to inhabitants lack of experience) reflects many communities at risk of various natural hazards all over the world. Therefore, determining how to promote preparedness behaviour for an infrequently occurring but inevitable natural hazard has implications not only for communities at risk of bushfires nationally and internationally, but also for communities at risk of other natural hazards.

2.2 Present and Predicted Bushfire Risk to Tasmania

The threat to people and property associated with natural hazards is increasing. This increase can be attributed to the interaction of three systems: the physical environment (including the natural hazards themselves), the social environment (the communities that are affected by them), and the infrastructure of the constructed physical environment (e.g., buildings, bridges, roads) (Mileti, 1999). For hazards that include a meteorological component, such as bushfires, risk is also increasing as a result of climate change. Furthermore, climate change will result in a change in the distribution of hazards, including their unfolding in areas where they have not been experienced before in living history.

According to the Commonwealth Scientific and Industrial Research Organisation (CSIRO, 2007), south-eastern Australia, where the highest bushfire risk is during spring (September – November), summer (December – February), and autumn (March – May), has the reputation of being one of the three most fire-prone areas in the world, along with southern California and Mediterranean Europe. The CSIRO has forecast that the fire weather risk and average number of days the fire danger rating will be very high or extreme (discussed in more detail in section 2.2.3) will increase significantly across most of Australia. The combined frequencies of days that the fire danger rating will be very high or extreme will increase between 4-

25 per cent by 2020 and by 15-70 per cent by 2050. These increases have been forecast to mainly affect the inland areas of Australia and thus the projections predict that Tasmania will remain relatively unaffected. From a research perspective, this provides a relatively stable environmental context within which individual and social dynamics can be studied.

The second major influence is population dynamics. Although Tasmania has the slowest growth rate of the Australian states and territories, for the past six years it has continued to grow at a rate of 0.9 per cent annually (ABS, 2011). At this rate the current Tasmanian population of 510,200 (March, 2011 data) will increase to approximately 580,000 by 2025; that is an additional 70,000 people living in Tasmania. Furthermore, 2009-2010 Australian Bureau of Statistics data shows that the fastest and largest population growth is taking place in the peri-urban areas (i.e., areas that border with forested or reserved bush areas); areas that pose the greatest bushfire risk.

Migration patterns such as these increase risk by bringing more people into areas where they are susceptible to experiencing loss from hazardous events. Furthermore, the fact that many of the people moving to these areas are 'tree-changers' or 'sea-changers' leaving larger metropolitan areas, means that these new residents will have little (if any) previous experience with bushfire or rural living (Childs et al., 2006; Eriksen & Gill, 2010; McGee, 2005; Weisshaupt, Jakes, Carroll, & Blatner, 2007). It is also important to consider population diversity here, particularly in relation to socioeconomic status. According to the Socio-Economic Indexes for Areas provided by the Australian Bureau of Statistics (ABS, 2008), and at the last revision in 2001, Tasmania was ranked more disadvantaged than the Australia average on three of the four socio-economic indexes. As such, when last

calculated, Tasmania was the most socio-economic disadvantaged state in Australia. Therefore, at least in an Australian context, Tasmanian residents' susceptibility to experiencing negative effects from natural hazard events is heightened by relatively low socio-economic status increasing their vulnerability as a result of, for example, their being less able to meet the costs associated with preparedness. The importance of this issue is heightened by the possibility that this may reduce the likelihood of significant sectors of the population attending to risk and preparedness information in the first place and identifies an important reason for outreach programs to be designed to engage with diverse groups.

The third dimension which contributes to societies' increased risk from natural hazards is the constructed world, the infrastructure (roads, bridges, house etc.) that are a result of and vital to societies' survival. Not only do natural disasters acting upon such structures increase people's vulnerability (e.g., earthquakes), but societies' (First or Third World) recovery following a natural disaster is hindered by the reliance on such seemingly vulnerable infrastructure (Mileti, 1999).

In the Black Tuesday bushfires of 1967 alone, over 3000 buildings (including 1293 homes, and 128 major buildings such as factories, churches, schools, and post offices) were destroyed. A further 1500 vehicles, 80 bridges, thousands of power poles, and 5400 kilometres of farm fences were burnt. In addition, 265,000 hectares were burn including orchards (20% of the State fruit crop), other crops, pasture and forest. The estimated economic cost at the time was more than $45 million, with a further $14 million in insurance claims (both 1967 figures) (VBRC, 2009). These figures were later recalculated to be in excess of $100 million (Emergency Management Australia, 2011).

As such, the bushfire risk and potential destruction and economic disruption such an event poses, renders initiatives to reduce bushfire risk in Tasmania a high priority. One of the most effective ways of achieving this is by increasing the capacity of individual property owners to protect their properties. However, for residents to make informed decisions about how to prepare (if at all) and how to behave in the event of a bushfire, they must first know what to expect.

2.3 What to Expect in a Bushfire

> An approaching bushfire is not like an approaching flood, which must, to some extent, follow the course of a river, or the breadth of a plain. One knows a mountain top will be safe in a flood, or that so many miles away will be safe from a volcano, or earthquake, or an area of radiation contamination. But with bushfire there are no such certainties. Bushfires can spring up, or descend or multiply anywhere, like a capricious chorus of dancing dervishes (Webster, 1986, p. 161)

Expecting the unexpected is arguably more realistic in terms of facing a bushfire. Although fire ecology can predict how fire will behave in a controlled environment, the fact that bushfires do not occur in a controlled laboratory setting renders predicting how bushfire will act challenging and highly problematic. A few assumptions can be made. In a major bushfire it will get very dark, it will be very windy, very noisy, and unbearably hot. Exactly when this will happen and how long it will last for is not known. The pre and post fire onslaught of airborne burning debris is also a given, however the size and rate of these falling embers is not predictable.

Bushfires are unpredictable, multifaceted, and complex in nature. Adequately preparing for bushfires and implementing these plans during a bushfire is both mentally and physically exhausting, with residents requiring to remain hyper vigilant for extended periods of time (e.g., in case of wind change, spot fires, dormant

embers, noxious fumes etc.) (Webster, 1986). Yet generic descriptions of what to expect are offered by fire agencies in an attempt to help residents prepare for bushfires. The following summarises what is currently provided by the Tasmania Fire Service (2011).

> Bushfires that threaten homes in Tasmania usually occur on hot, dry days with strong gusty winds. Residents who are threatened by such a fire will experience high smoke and limited visibility to the extent that often day appears to turn to night. Breathing will become difficult and eyes irritated and red further adding to the poor visibility. As the fire front approaches it will become darker, hotter and a greater concentration of embers (airborne particles that are on fire) will land around residents' homes. As the fire front gets closer residents will be able to hear its roaring noise. This roar has been likened to the sound a jet engine makes when it takes off. Embers will rain down on roofs at the rate and with the sound of heavy hail. These embers will be blown into crevices of houses and collect in corners potentially burning down homes before the fire front gets there.
>
> On days of 'catastrophic' fire danger ratings, winds may be strong enough to blow roofs off house, bring down power lines and trees. These winds may occur before the fire front has arrived potentially cutting off power and limiting escape routes. As the fire front nears, the radiant heat from the flames may become unbearable forcing residents to take shelter, preferably within well protected homes. The fire front passes relatively quickly, usually taking less than 30 minutes. Once the fire front has passed and the noise has abated, it is

> usually safe for residents to leave the shelter of their houses; however, outside will be very unpleasant; hot, windy, and smoky. Once the fire front has passed residents need to quickly extinguish any burning material that might set fire to their homes and continue checking inside and outside their homes as embers can cause fires to start hours after the initial front has passed. Residents also need to be aware that the fire's radiant heat will persist and embers continue to fall for several hours after the fire has passed (Tasmania Fire Service, 2011).

In the event of a major bushfire, fire agencies cannot stop, extinguish or control the fire front. At best they may be able to redirect or slow its progress. Awareness and acceptance of this is essential in order for residents to become psychologically prepared to face a bushfire. However, even this recognition and the prior knowledge of what might be expected in the event of a bushfire, may not be enough to quell the terror and confusion often experienced by those who have lived through them.

Fighting a major bushfire may be one of the most frightening experiences a resident may have. Anecdotally, for some residents, successfully defending their home presents them with a great sense of achievement, empowerment, and renewed appreciation for life (e.g., post traumatic growth; see Holgersen, Boe, & Holen, 2010; Whaley, 2009). Many other residents, who also successfully defended their homes in a bushfire, later claim that the experience had been too traumatic for them and that they never wanted to go through that experience again. Others have reported that under no circumstances would they expose their children to such conditions and would thus never attempt to stay and defend their home. Others again explain that in retrospect, their physical fitness was inadequate to cope with fire-fighting in those

extremely hot and stressful conditions. Recognising this diversity of residents' attitudes and feelings towards bushfires and understanding why such diversity exists (e.g., previous experience, community narratives) is therefore essential to effectively promoting community bushfire preparedness. A community engagement to increasing bushfire preparedness which facilitates such an understanding is discussed in section 3.2.

In 'extreme' or 'catastrophic' (fire danger ratings discussed in subsequent section) fire conditions, the risk of dying of being seriously injured is high. Unless a home has a defendable space, has been prepared and its occupants are prepared for bushfire, or built/designed specifically to withstand bushfire, attempting to stay and defend would be potentially life threatening (Tasmania Fire Service, 2011). Therefore, preparing for bushfire provides the best chance of survival for householders since it cannot be guaranteed that fire agencies will have the capacity to protect threatened homes or are able to provide enough warning for timely evacuation.

Despite these objective benefits, what the earlier accounts of residents offer is insights into the differences in meaning that people attribute to bushfire events and the range of influences that contribute to the development of meanings and their implications for preparedness decisions and actions. This diversity needs to be given a prominent position in preparedness research and provides support for the direction pursued in the present research. This highlights the need to consider how people interpret the context in which bushfire preparedness decisions are made.

One such influential context is that provided by the emergency services who issue bushfire warnings and alerts in an attempt to guide subsequent protective

behaviour. These alerts and warnings, and the appropriate response to them, are discussed in the following section.

2.4 Bushfire Alerts and Fire Danger Ratings

To give residents the best possible chance for implementing their bushfire plans and surviving bushfires, the Australian Government and fire agencies have adopted a system of bushfire alerts and fire danger ratings to help warn the public about threatening bushfires and provide detail about the nature of them. When there is a risk from bushfire, Bushfire Alerts provide information to threatened communities using radio, television, the internet and/or telephones (automated voice or text messages). There are three Bushfire Alert levels to help residents make an informed decision about their bushfire safety (Table 2).

To further help inform the public to make appropriate decisions in the event of a bushfire, Fire Danger Ratings are provided by the Tasmania Fire Service to rate current and forecast bushfires. Fire Danger Ratings are published in the major Tasmanian newspapers to forecast the next day's expected bushfire conditions, as well as being published on both the Bureau of Meteorology and the Tasmania Fire Service Websites. The Fire Danger Rating provides an indication of the probably consequences of a bushfire if a bushfire was to start (Table 3) and is thus used as a reference system in conjunction with the Bushfire Alerts.

Table 2

Bushfire Alert Levels Issued by the Tasmania Fire Service during Bushfire Events

Alert Level	Recommended action
ADVICE	A fire has started. There is no immediate danger. Stay up to date in case the situation changes.
WATCH AND ACT	There is a heightened level of threat. Conditions are changing and you need to start taking action now to protect you and your family.
EMERGENCY WARNING	An Emergency Warning is the highest level of Bushfire Alert. You may be in danger and need to take action immediately. Any delay now puts your life at risk.

These Bushfire Alerts and Fire Danger Ratings were updated following the devastating 2009 Black Saturday Bushfires. Prior to 2009, the Fire Danger Ratings were scored from 0 to 100, with the highest rating being 'extreme'. Since the fires in Victoria in 2009, a new level, 'catastrophic', was introduced to categorise bushfires scoring over 100 (a calculation based on temperature, wind speed, relative humidity, soil moisture etc.), and in recognition of the fact that in some bushfire conditions, no amount of preparation will be adequate. This new category was thus introduced just as the present study was collecting its first wave of data. It was thus anticipated that both the 2009 Victorian bushfires and the new Fire Danger Rating of 'catastrophic' might feature in some of the data (both qualitative and quantitative) collected.

Table 3

Fire Danger Ratings Issued by the Tasmania Fire Service to Provide Information and Advice

Fire Danger Rating	Recommended action
CATASTROPHIC	For your survival, leaving early is the ONLY option. Leave bushfire prone areas the night before or early in the day – do not just wait and see what happens. Make a decision about when you will leave, where you will go, how you will get there and when you will return. Homes are not designed to withstand fires in catastrophic conditions so you should leave early.
EXTREME	Leaving early is the safest option for your survival. If you are not prepared to the highest level, leave early in the day. Only consider staying if you are prepared to the highest level – such as your home is specially designed, constructed or modified, and situation to withstand a fire, you are well prepared and can actively defend if a fire starts.
SEVERE	Leaving early is the safest option for your survival. Well prepared homes that are actively defended can provide safety – but only stay if you are physically and mentally prepared to defend in these conditions. If you're not prepared, leave early in the day.
VERY HIGH HIGH LOW MODERATE	Review your Bushfire Survival Plan with your family. Keep yourself informed and monitor conditions. Be ready to act if necessary.

The effectiveness of these warnings and alerts however, are a function of people's ability to interpret and act on them. As highlighted by the descriptions above of what to expect in a bushfire, what is required to adequately prepare for them is both multifaceted and complex.

This suggests that an understanding is also required of how people interpret what they are being asked to do and why they are being asked to do so. A description

of what residents are required to do, as recommended by the fire service, to adequately prepare for bushfires, and how this may be interpreted by them, thus follows.

2.5 Preparing for Bushfire

The most important decision a household can make in preparing for bushfires is whether they will 'leave early' or 'stay and defend'. The importance of this decision lays in the fact that the majority of deaths during bushfires result from people trying to leave their properties at the last moment. People who leave late are at greater risk of getting caught in their car or on foot and dying from radiant heat, dehydration, or asphyxiation (from extreme heat causing throat to swell) (Tasmania Fire Service, 2011; VBRC, 2010; Webster, 1986). However, the dilemma of leaving early in bushfire situations is that the only guaranteed safe time to go is when the bushfire is so mild that there is little danger, and thus most people feel reluctant to go and instead choose to 'wait and see'. As such, even if a household decides to 'leave early' it is strongly advised that they also prepare to 'stay and defend' (details of which will be outlined shortly) in case they are unable to leave early (e.g., no warning, evacuation route blocked). Similarly, for those households who decide to prepare to 'stay and defend', it is important that they also prepare for the possibility of having to leave early in the event of circumstances rendering staying to defend futile (e.g., may not be physically capable of defending due to illness, broken leg, or do not feel psychologically capable of staying).

As such, the most important preparedness measure for bushfires is to have a Bushfire Survival Plan; a written plan of what to do, who does what, what to take, where to go, what to do if the family are not together, where to meet, and the prompts for each behaviour so as to reduce the possibility of making rushed and

dangerous decisions under the inherent stressful conditions of a bushfire (Tasmania Fire Service, 2011). This requirement of deciding whether to stay and defend their property or to leave well before the fire front arrives introduces a fundamentally unique and convoluted quality to bushfire preparedness. It reiterates the need to think about the relationships between preparing and warnings, two processes that are generally considered independently of one another.

As well as requiring considerable planning, preparing for bushfire also requires year-round maintenance of vegetation around the property and of the home itself. There are also a vast number of structural and personal survival readiness measures to be adopted and community planning to negotiate. As such, preparing for bushfires requires the interpretation of much information and the implementation of many actions.

Furthermore, these actions need to take place before the bushfire season starts in order for them to be most effective. This is due to the fact that bushfires are unpredictable and can strike with little or no warning, owing not only to the dynamic nature of the environment, but the growing rate of arson (Muller, 2008). This reinforces the need to be initiating preparation procedures in times of hazard quietude, or better still, all year round. Adopting preparedness measures prior to the onset of a hazard event provides the best possible chance for protecting both people and property (Lindell & Whitney, 2000). A description, although by no means exhaustive, of what is required for residents to become bushfire prepared thus follows. This information has been collated from Webster (1986) and the Tasmania Fire Service (2011).

2.5.1 Planning

Residents' forward planning for the safety of their property, family members, pets, and precious possessions is fundamental to avoiding last-minute panic if a bushfire threatens their area. The most important task to complete is a written bushfire survival plan which will also act to prompt the various preparedness measures that need to be undertaken throughout the year and before the start of every fire season (Note: bushfire survival plans provided by fire services Australia wide usually contain helpful checklists and a step-by-step guides to completing bushfire plans). Other planning includes discussing with family members what possessions they consider precious and wish to save, and where to keep them (e.g., keep in a box ready to go, or buried during fire season, or stored at a friend or relative's place during the fire season), knowing what to do with pets and/or livestock if bushfire threatens (e.g., mustering plan for stock, emergency yard), and practicing the family fire drill (e.g., alerting authorities of fire, closing windows, filling bath/sink/buckets with water, starting pump etc.). Residents should also have discussions with employees about the possibility of staying home during a Total Fire Ban Day or when fire weather has been forecast to be extreme or catastrophic, and with their children's school about their bushfire plan and parent expectations during a bushfire.

Residents should also consult with their neighbours regarding their plan during a fire and work together to manage shared boundaries and fire breaks (discussed in more detail in section 2.5.6). Residents should find out about local community refuges if available, and consult with neighbours to determine whose property is the safest in case community refuges are not opened or cannot be reached. The local fire service should also be contacted and a regular inspection organised to check that property is adequately prepared. These examples account for

only some of the planning that is required for residents to become adequately prepared for bushfire.

2.5.2 Property maintenance

Keeping the grounds around a property tidy and clutter free can greatly reduce the risk of houses burning in the event of a bushfire (Webster, 1986). Reducing the density of vegetation on their property is one controllable way of reducing the intensity of a bushfire. In fact, halving the fuel density will reduces the intensity of the fire by four (Webster, 1986). As such, fire agencies recommend a cleared defendable space of 30 metres around the home on a level block or greater if property is on a slope (due to fires travelling more quickly up hill). Raking leaves and fine fuel, slashing paddocks, pruning trees, and burning off is therefore property maintenance that should be done year round to reduce the concentration of work required leading up to the fire season. Concentrated fuels such as wood heaps, stored timber (often under homes), and gas bottles should also be moved well away from the house before the start of the fire season.

Around the home, regardless of the building materials used, maintenance such as painting, filling holes, fixing loose roofing, and checking gutters should also be conducted. Small embers can enter the roof space or under the house through the smallest of gaps and cause houses to burn down hours or days after the fire front has passed. Fire fighting equipment such as fuel pumps need to be checked and/or serviced and hoses inspected for wear to ensure they are in perfect working order prior to every fire season.

2.5.3 Fire fighting equipment

Personal fire fighting equipment such as hoses that reach around the house (with mist/jet nozzle as mist can be inhaled to ease breathing), fire pumps (5 horse power, easy to start, self-priming fuel driven, meshed covered inlet, housed in own shelter), and independent water supply (e.g., water tanks, dams, swimming pools) are highly recommended if residents intend to stay and defend their house, as mains water supply will be limited if available at all (due to electricity being switched off or high demand). In terms of tanks, residents should choose concrete or metal spiral tanks as these a more resistant to fire damage, and unlike bladder filled or poly tanks, are less likely melt (Blanchi et al., 2007; Webster, 1986). Additionally, a knapsack spray pump for extinguishing spot fires outside and in roof spaces and eaves, sprinklers, buckets, fire extinguishers, beaters/mops, and ladders are also recommended fire fighting equipment.

2.5.4 Structural

One of the biggest risks to properties during bushfires is airborne embers which can destroy homes that are kilometres away from the actual fire front. As such, fire agencies recommend installing metal gutter guards, sealing around doors and windows to eliminate gaps embers can enter, enclose areas under the house, repair or cover gaps in external walls, and attach a sprinkler system to gutters. Fire investigators suggest that building cladding type or construction materials make little difference to the survival of houses (Webster, 1986). Rather it is the protection of windows and blocking of gaps that are fundamental to protecting homes from burning down. As such, it is recommended that non-flammable shutters or metal or bronze flywire covers are installed or at least fitted to windows on days of high fire danger as they will not only stop sparks, but also embers, burning brands, and flames

from getting inside the house. There are a plethora of other structural considerations such as house profile (low), roof pitch (gentle), roofing (continuous, flat-troughed steel), foundations, gutters, eaves, ceiling, chimneys, to name a few, that householders should consider if living in a bushfire prone area.

Discussion of all structural considerations are beyond the scope of this thesis, but are alluded to here to highlight the complexity of becoming bushfire prepared, the multitude of options householders must consider, the information they must interpret, and the therefore ensuing diversity of levels of bushfire preparedness that are adopted by householders.

Regardless of whether residents intend to stay and defend or leave early, an emergency or bushfire survival kit is paramount. This kit should be packed and ready year round, with every member of the household knowing where it is in the event of an emergency.

2.5.5 Survival

A personal survival kit of protective clothing and accessories is the most important facility for personal survival during a bushfire. A bag with these items should be prepared well before the fire season and set aside with the resident's other fire fighting equipment. For personal safety clothing including long close-fitting trousers of pure wool, heavy cotton jeans or a coverall, long-sleeved wool top which does up to the neck, and a broad-brimmed hat to cover the hair with a band attached (to stop it flying off in the intense winds), are recommended. Sturdy leather boots with nitrone (tyre rubber) soles, pure wool socks, and wool balaclava (to protect sensitive check and forehead areas), as well as strong gardening gloves should also be worn.

Accessories such as a nose cover (e.g., handkerchief, small scarf) or smoke-filtering mask, goggles, and a bottle of artificial tears (eye drops to prevent eyes from drying out) are also recommended. One of the most important items to include in a survival kit is a large thick pure wool blanket or textured fibreglass blanket (i.e., fire blanket) big enough to cover a person completely when crouching or lying down. This can be used to douse small fires or protect a person if no other shelter can be found (Webster, 1986).

Similar to other natural hazards, having a 'survival pack' including non-perishable foods, bottled water, battery operated torches and radio, two-way radio, whistle, mobile phone and charger, medications, money, as well as copies of important personal documents (e.g., passports, birth certificates, insurance policies) may become invaluable in the event of last minute unplanned evacuation or the potentially resultant aftermath which may see taken for granted services (e.g., local shop, petrol station) destroyed.

2.5.6 Community

Due to bushfires impacting whole communities and residents' safety being very much a function of their communities' and neighbours level of preparation, collectively ensuring the community is prepared for bushfire is residents' best hope of surviving a bushfire. Working with other community members is not a separate stage in itself but should rather take place at all of the above mentioned preparedness phases or levels. For example, during the planning stage residents should engage with their neighbours to organise working bees to thin out joint environment and create joint fire breaks, work together to lobby the council to do its share of continuous chores, establish town fire breaks and refuges, and discuss and organise

prior to fire season for teams of evacuated residents to return after the fire front has passed and during crucial post-front time (dousing spot fires) for saving buildings.

Residents should also talk to their neighbours to determine whose home is most prepared in case the community refuge is not available or cannot be reached in time. Residents should also ensure routes to community refuges are safe and well practiced, and time how long this trip takes taking into account low visibility, the heat, tiredness, and traffic jams. Residents should also know other neighbours' fire plans, have telephone numbers, advise each other if holidaying during the fire season and discuss expectations (i.e., should neighbour try and save house if they can).

Again, this is by no means an exhaustive list but illustrates the importance of viewing resident preparedness in terms of the whole community's bushfire preparedness. It also introduces the complexity inherent in preparedness (e.g., in relation to, for instance, the knowledge of ecology people require and the decision and competence elements involved in preparing). By working together to build their capacity to cope with bushfires (or any hazard), communities will develop and thus be able to draw on internal resources and competencies that will allow them to manage the demands, challenges, and changes posed by future hazards. Community preparedness therefore fosters more resilient communities (Paton, 2006; Paton & Johnston, 2001; Peterson & Reid, 2003).

2.5.6.1 A word on 'community'

'Community', a term that will be used throughout this dissertation, is now widespread in hazard research and emergency management policy in Australia. This reflects the growing international recognition of the importance of community power, fostering resilient communities, and encouraging stronger links between

communities and government institutions (Phillips et al., 2011). Even the variables used in the present study to model bushfire preparedness (e.g., sense of community, community involvement) are generic in nature and although they accommodate for differences in the nature of 'community' and assesses the degree of participation in it, they does not explain who or where people participate. This signals the need for a clearer definition of community and further exploration of 'who', 'what', and 'where' the present study's community measures are referring to.

In order to explore the 'who', 'what', and 'where', a mixed-methods approach, adopting both qualitative and quantitative data analysis techniques, is required so to obtain a richer understanding of how these individual and especially social variables interact and influence communities' bushfire preparedness. These data will be presented and explored in Chapter Six (quantitative component) and Chapter Seven (qualitative component). Application of these findings will be presented in the action research component of the study outlined in Chapter Eight. Discussion now turns to providing a definition of community for the purpose of the present study.

When the concept of 'community' is used by hazard research and emergency management policy makers, its meaning is often assumed. This has resulted in the term losing definition and its capacity to organise thinking about an important level of bushfire preparedness. Community is a term that conveys different meanings to different people and while an all-inclusive definition remains contested, many descriptions and useful classifications have been proposed.

Community is most commonly, and broadly defined as an inhabited geographically defined area or group of people that can be identified by common

culture, interest, values et cetera, but who remain unbounded by the physical locale. This is the definition that is most appropriate for studying hazards whose location is geographically defined. Community as a locality is a commonly used definition of community in the hazards literature (Cottrell, 2005), especially in terms of bushfire preparedness as people living in the same area will likely experience the same bushfire risk. As a result, risk communication is mostly directed at localities. Furthermore, local fire brigades define their response area, or community they feel responsible for, as a certain area, often defined by park boundaries, topography, and council peripheries, around their fire station.

In the present study, community is defined primarily in relation to a specific geographic location with a municipal and corresponding fire brigade response area that is identified by its residents with regard to its falling within an area identified as being at risk from bushfire. While location is appropriate for defining the physical area exposed to risk, it is not useful for capturing the social and psychological diversity inherent within these areas and which can influence patterns of association between those residing within a location. Consequently, the communities in the present study are recognised to comprise of multidimensional attributes of place including groups of people living in a geographical proximal area, who share a common culture, values, beliefs; attributes which may or may not be bounded by the physical space. As such, the notions of community and place attachment (discussed in greater detail in section 2.6), which are integral to this study, are intimately related.

2.5.7 When bushfire threatens

The above sections provide a basic account of the myriad of decisions and considerations, as well as recommended actions residents need to adopt if living in bushfire risk areas. If this preparation is conducted throughout the year residents will be ready in the likely event of a bushfire occurring with little warning or out of season. The confusion and panic that often takes hold as a bushfire threatens renders trying to adopt these preparations at the last minute futile. Even residents who are prepared leading up to the bushfire season may find that the events that unfold on a 'blow up day', and the series of actions that need to be implemented to initiate their bushfire plan, to be overwhelming and chaotic. It is for this reason that a detailed, written, and well-practiced bushfire plan is the most important preparedness measures residents can make.

If bushfires do start on an extreme forecast bushfire day, warnings from officials are likely to be short notice, if at all. Therefore, if residents receive advance warning of potential bushfire danger (i.e., extreme fire danger day forecast), they should be mowing lawns, clearing gutters, moving stock into refuge areas, clearing under the house and grounds of flammables, and contacting schools/residential care homes to find out what their plan is in the event of a bushfire.

Residents at this time should also check fire equipment and survival kits, decide to stay home from work or cancel planned trips, and constantly monitor the radio/television/internet for weather updates and bushfire bulletins.

If smoke is seen residents should report this to authorities and implement the next stage of their preparedness plan. This should include, but is not limited to; putting on protective clothing, sealing windows, shutters, and doors, blocking

downpipes, filling gutters with water, put water in receptacles in strategic places, and attach hoses. If residents are planning to leave early this is the latest time for evacuation as long as the fire is moving slowly and time is available to reach a safer place.

When embers begin to fall around the house and on the roof, residents can assume that a bushfire is dangerously close. Activities now include watching for and dousing spot fires that may start as embers land. Roof spaces, eaves, gutters, and subfloors are common areas that embers enter and find material to ignite. Residents should also watch for and douse spot fires that start on neighbouring properties. This is not only to protect neighbours' properties but to avoid nearby burning buildings spreading to the resident's own. Sprinklers should only be turned on once ash and embers start to fall or water will be wasted through evaporation. As the fire encroaches and starts to fall, residents need to try hard not to panic as panic will cause the clouding of judgement which can be fatal at this crucial time.

As the fire front arrives, residents need to take shelter indoors while waiting for the fire front to pass. This usually only takes 5 to 15 minutes, while the radiant heat peak typically only lasts for 60 to 90 seconds. Showers of embers will start about half an hour before the flame front arrives and continue for three to four hours after it has passed through. As residents shelter inside they need to remain vigilant of embers entering the house and douse any fires that start as a result. Residents at this point should never leave the house to extinguish spot fires outside as these can be doused after the short time it takes for the fire front to pass.

Returning outside after the fire front has passed is the most crucial time to save houses and buildings (Webster, 1986). Dousing small fires that may still be

burning, checking for smouldering embers in roof spaces, eaves, under the house, in gutters, and verandah corners and door mats, will save homes that may otherwise burn down hours after the fire front has passed. Residents will have to maintain constant vigilance for hours and days until all fires in the area have been extinguished. During this time sudden gusts of wind could blow embers from still smouldering trees (which can burn above and below the ground for weeks) into houses resulting in residents losing their homes even after they have survived the shock of a bushfire.

Even if a resident and their family successfully defend or are able to return to a still standing house, the destruction caused by bushfires to taken for granted amenities such as general stores, fuel depots, sewerage, water, and electricity ensure that the aftermath will present many physical and psychological challenges. This is where previously prepared survival kits including food and water provisions, money, important documents, and communication sources will become invaluable as post-fire coordination and arrangement are made. It is also during this time, which may last for days, weeks, months or longer that the support of neighbours and the wider community is paramount and unfurls implicitly if these bonds are already established prior to the fire event.

2.5.8 Diversity of preparing for bushfires

As is evident from the above described recommended protective measures and actions, what residents actually do and thus their level of bushfire preparedness can, and will, vary greatly. What constitutes being prepared also depends on a multitude of different variables including, but not limited to; whether a resident has decided to leave early or stay and defend, their physical and psychological capabilities, their surrounding physical environment and property slope. Therefore,

being adequately prepared is context specific but is also subject to individual interpretation of what being prepared means. The two following examples (high and low level preparedness), provided by the Tasmania Fire Service, demonstrate how greatly being prepared can vary depending on resident interpretation.

- High level preparedness example – Having a written bushfire survival plan (important numbers, triggers to not staying and defending, action plan before, during, and after fire, backup plan), fuel powered fire pump, reliable water source, fire hoses that reach around house, ember proof house, personal protective clothing (sturdy boots, long sleeved non-flammable top, non-flammable pants, hat, goggles, mask), survival 'ready to go' kit (including food, water, medication, mobile phone, charger, battery operated torch/radio, money, woollen blankets, important documents and copies in a folder), maintain property (cleaned gutters, keep lawns mowed, green, remove ground litter, reduce vegetation growth 30 metre radius around home). [Note: this is only an example; well-prepared individuals who plan to leave early may have a very different plan]
- Low level preparedness example – Believe they know what to do if there is a fire, will decide whether to stay or leave on the day (believe not very far to nearest town), have garden hoses and town water, know where important documents are approximately, aware of recommended protective clothing to wear and have some in wardrobe somewhere, mow lawns intermittently over summer.

The above example of low level preparedness (or not prepared) reflects the position of many residents who have some understanding of the recommended preparedness actions but have not purposely undertaken any. Such residents will

indicate ‘having a water source’ or having ‘protective clothing’ but upon further inspection, have not engaged in the appropriate action to render these ‘measures’ effective (e.g., may have town water source but this often fails during emergencies). As discussed earlier (sections 2.5.2 and 2.5.8), unless residents have actively planned what they intend to do in an emergency (i.e., have a written and accessible bushfire survival plan, and practiced it), the stress and anxiety experienced during a major bushfire event will reduce residents’ ability to think rationally, effectively problem solve, and make safe decisions (Gollwitzer, 1999).

This diversity in residents’ interpretation of what is required to become adequately prepared and their subsequent decisions and behaviour thus calls for further investigation. Determining how residents interpret the information they are provided is therefore essential to developing more effective bushfire risk communication and education programs and the ultimate goal of avoiding loss of life and property. The focus of the present study was therefore to determine how residents interpret the information they are provided, how their social environments influence this interpretation, and thus what accounts for this diversity. The above discussion has portrayed people as preparing, albeit to varying degrees. This is not the only outcome that can ensue from people’s interpretation of risk. For some, their response is to do nothing.

2.6 Why Do People Not Adopt Protective Measures?

This diversity in residents’ level of preparedness is unfortunately skewed in the direction of the majority of people living in bushfire prone areas not having adopted adequate bushfire preparedness measures, intentionally or unintentionally (Eriksen & Gill, 2010; Johnston et al., 2005; Paton, Bürgelt, et al., 2008). Regardless of the ever increasing risk of bushfire to Tasmanian residents, due to the interaction

between the human and natural environments (e.g., urban expansion into the peri-urban zone), changing climate and population growth, the potential for social and psychological disruption, and the recommended actions, warnings and advice that are in place to aid and support residents to prepare for bushfires, people still remain unprepared for bushfires. As such, an exploration of how residents interpret this information, and what influences people's decision to prepare, or not prepare, is required.

2.6.1 Interpretive influencers of preparedness adoption

Rational decisions are not always reached by people as a result of their cognitive reasoning – partly due to the social construction of risk, and partly because cognitive processing utilises the information at hand, and often with deduction aimed not at reaching a rational outcome, but to reach the most agreeable outcome (Finucane, Alhakami, Slovic, & Johnson, 2000; Loewenstein, Weber, Hsee, & Welch, 2001; Rudski, Osei, Jacobson, & Lynch, 2011; Tversky & Kahneman, 1992). As such, individuals' judgements are often biased by their attitudes, beliefs, emotions, and feelings at the time of decision-making (I liked the shoes' colour but forgot to try them on for size), leading to irrational choice (Kahneman, 2003; Loewenstein et al., 2001; Rudski et al., 2011)

2.6.1.1 Cognitive biases

The discrepancy that exists between residents' estimates of their bushfire risk and level of preparedness and their fire agency counterparts', can be explained to a large degree by the influence of cognitive biases and social processes. For example, the discrepancy between expert and citizen estimates of risk can reflect residents' tendency to underestimate their relative risk to natural hazards because they overestimate their existing knowledge (Ballantyne, Paton, Johnston, Kozuch, &

Daly, 2000). In other words, if an individual believes they know how bushfires behave and believe they know what mitigation measures to adopt and have adopted these, they may feel they are adequately prepared for bushfire and not heed any new or subsequent information or warnings. As such, perceptions about hazard specific knowledge can actually act to reduce the likelihood of preparedness measures being undertaken because the individual may become overconfident about their ability to deal with a hazard and thus underestimate their vulnerability (Lindell & Whitney, 2000).

Furthermore, individuals rate their level of preparedness by comparing themselves to others in their community. Community members often rate their own preparedness as being higher than the average for their community. This statistical anomaly, referred to as unrealistic optimism bias, results in people accepting the need for greater preparedness in their community but perceive this information as being relevant only to other residents and not themselves (Gold, 2008; Paton, Smith, & Violanti, 2000; Weinstein & Klein, 1996). As a result, although people may attend local bushfire information evenings or forums, they may not perceived the information that is given as being relevant to them, and merely attend to confirm what they perceive they have already done, as being adequate. As such, these individuals transfer risk to others within their community, and as a result, if all members are interpreting their relationship with the hazard in this way, with action being the responsibility of others, motivation to prepare will be diminished.

A further bias is the tendency for individuals to overestimate the capacity of hazard mitigation measures to remove the perceived threat. This interpretative bias, known as risk compensation (Adams, 1995; Paton, Smith, Daly, & Johnston, 2008), describes how people maintain a balance between the perceived risk of a particular

hazard and the perceived level of safety provided by their environment. An increase in perceived environmental safety (e.g., fire agencies conducting controlled burns, investing in new fire trucks, updating bushfire ratings scales) results in a reduction of the individual's perception of the risk. As a result increasing people's hazard knowledge through information provision may in fact result in the perceived risk and motivation to prepare being reduced (Ballantyne et al., 2000). Furthermore, people may attribute responsibility for hazard mitigation to the provider of the information (e.g., government agency) since they are obviously aware of the risk.

2.6.1.2 Cost/benefit analysis

Another factor that can complicate volitional behaviour arises from the cost/benefit analyses individuals engage in when deciding whether to adopt certain behaviour. In regard to health behaviours (e.g., smoking, dieting, exercising), the costs and benefits associated with adopting these behaviours are usually apparent soon after their initiation. Such relatively immediate reinforcement of behaviour does not apply to decision making about infrequent natural hazards whose return periods can mean that people may not experience them for years or decades. This discrepancy affects preparedness decisions. For example, the 'costs' (as can often require significant monetary contributions) of preparing for bushfires (e.g., buying a fire fighting pump, installing sprinklers, and clearing vegetation around the property), are immediate, but the benefits of such bushfire preparedness action may not be appreciated for years or even in the individual's lifetime due to the infrequent nature of major bushfires.

Therefore, regardless of whether residents are aware of the bushfire risk and the recommended preparedness actions, their automatically adopting these preparedness measures is a function of other cognitive and social influencers. As

such, simply telling residents to prepare because it will reduce the negative consequences attributed to bushfire risk is not enough to prompt their preparing. This therefore questions the assumptions upon which current practices of fire agency risk communication and education strategies are based (Lindell & Whitney, 2000).

Consequently, of all the recommended bushfire adjustments described in section 2.5, those that are engaged in as part of everyday property maintenance (see section 2.5.2), and coincidently also reduce bushfire risk, are the most commonly reported 'preparedness measures' adopted. These are usually low cost, low effort adoptions that fulfil multiple functions (e.g., mow lawn for aesthetic purposes, have a two-week supply of food because it is cheaper to buy in bulk). These adjustments appear to be more popular than vegetation modification (e.g., clearing and pruning trees) and structural changes to homes (e.g., retro-fitting window shutters, Gutterguard) (Brenkert-Smith, 2006; McFarlane, McGee, & Faulkner, 2011; McGee, 2005). This reflects the interpretive influence of cost/benefit analyses that residents undertake in their everyday dealings when deciding whether to adopt certain behaviour.

It appears then that interpreting bushfire risk and deciding what to do about it is related to the way residents' manage their everyday daily hassles.

In their mixed-method study of the bushfire awareness-action gap of residents living in bushfire-risk communities of New South Wales, Australia, Eriksen and Gill (2010) determined that dilemmas of everyday life influenced residents' attitudes to adopting bushfire protective measures. Day-to-day hassles such as costs (in terms of monetary and time values), gender role disparity, and managing priorities were found to inhibit householders from transferring bushfire

risk awareness to bushfire preparedness. This suggests that in order to successfully communicate bushfire management issues to residents living in bushfire risk areas, community outreach programs must acknowledge that to individuals, bushfire risk is interpreted alongside and thus competes with, other aspects of the householders' everyday life.

Unlike daily hassles however, bushfires are infrequently occurring events and thus constitute a degree of uncertainty for the resident. This is further emphasised by the fact that the bushfire hazard itself is a complex and multifaceted phenomenon (see section 2.3), which thus reflects the diversity of actions that are required to adequately prepare for them (see section 2.5). However, similar to daily hassles, if a resident is faced with uncertainty and is unsure of how to act, they turn to easily accessible information sources; those found within their social environment.

2.6.2 Why traditional means of promoting preparedness do not work

Bushfire risk communication is traditionally based on a top-down, generic model whereby at-risk individuals and communities are targeted with information and education programs aimed at increasing risk perception and prompting people to take actions to minimise the negative consequences of bushfires. This information is usually provided in the form of a standard brochure, television advertisement, website, or booklet, and is distributed to those in the community whom fire agencies deem to be at-risk of bushfire (this important distinction between agencies' views of community risk and the residents' beliefs in their risk have important implications for information relevance which will be discussed in section 9.2.4).

There are however, several short-comings of most public education programs. Prominent amongst them is the assumption that making information about

hazards and knowledge about a hazard risk available will automatically lead to the adoption of protective measures and increase levels of preparedness. In fact the efficacy of the bushfire alert and warning systems discussed in section 2.4 relies on the assumption that people know how to prepare and have actually implemented the recommended actions. This commonly held belief that information provided by fire agencies will effectively promote bushfire preparedness, appears however to be unfounded (Paton, 2003). Research has consistently demonstrated that simply making information on risks and hazards knowledge available fails to automatically promote hazard adoption (Ballantyne et al., 2000; Duval & Mulilis, 1999; Gregg, Houghton, Johnston, Paton, & Swanson, 2004; Johnston et al., 2005; Lindell & Perry, 2000; Lindell & Whitney, 2000; McCaffrey, 2004; McFarlane et al., 2011; Paton, Smith, & Johnston, 2000).

For example, McGee's (2005) study of the motivations for bushfire hazard adoption of residents living in Edmonton, Canada, found that regardless of residents' concern about bushfires in their area or their perceptions of the likelihood that such fires would affect their properties in the near future (likelihood in next two and ten years), no significant difference in number of preparedness measures adopted were found. Furthermore, of the 14 bushfire preparedness adoptions measured, residents had on average adopted less than half of these (46.71%). Studies of other hazard preparedness adoption have resulted in similar findings (e.g., Heller, Alexander, Gatz, Knight, & Rose, 2005; Johnston et al., 2005; Miceli, Sotgiu, & Settanni, 2008; Sagala, Okada, & Paton, 2009).

Thus while it is undeniable that awareness of bushfire hazards and the risks they pose is an essential precursor to taking action, they are not necessarily sufficient to do so (McCaffrey, 2004; Rhodes, 2003). Consequently, the assumption that this is

sufficient in traditional models plays a significant role in the failure of public education to promote the adoption of bushfire preparedness. This introduces the fact that it is not information *per se* that determines whether protective measures are adopted, but rather how people interpret this information in terms of their previous experiences, beliefs, and expectations (Lindell & Whitney, 2000; Paton, 2008; Rohrmann, 2000). People are not passive recipients of information but rather act towards things in a way that is consistent with the meaning they have constructed around that thing (Blumer, 1969). It follows that if the preparedness process is to be understood, it is pertinent to explore how interpretation occurs and to articulate the personal and social factors that inform it.

As discussed in section 2.6.1, individuals' perceptions of risk and the interpretive processes that subsequently influence hazard adoption decisions, are affected by a variety of factors. One thing that is crucial here is to understand that interpretive processes occur in complex environments.

2.6.3 The complexity and uncertainty associated with bushfires

As illustrated in sections 2.3 and 2.5 bushfires are very complex natural phenomena which present many unknowns (e.g., magnitude, duration, direction, ferocity). Every bushfire is different because the three elements needed for bushfire; fuel, oxygen, and ignition source, always vary. When and how they interact with the built environment is similarly unpredictable. Furthermore, although bushfires occur every year, they do not always threaten lives or property, and when they do they usually affect only one area or community (i.e., risk in any one location is low).

As such, many residents living in at-risk areas in Tasmania have never experienced bushfires personally (and as a result may not perceive there to be a

threat and thus prepare for bushfire – see section 2.1). Under such ambiguity, residents' choices cannot be informed by familiarity because they have no previous experience, nor can they conceive the effects of such threats, and as such, it is difficult to respond to them given they have little knowledge about how or when to do so (Basili, 2006; Kahneman, 2003). The uncertainty and unfamiliarity of such circumstances further contribute to the hazardous nature of bushfire situations. Adding further to the potential threat and negative consequences of facing a bushfire is that poor judgements or the flawed processing of available information, made before and during a bushfire, can greatly increase the threat to life.

Even residents who have experienced bushfires, and therefore may have some knowledge of how to prepare for them, the size, duration, direction, and ferocity of future bushfires are completely unknown. For residents inexperienced with bushfire, which represent a large proportion of residents in Tasmania, and thus in the present sample, the complexity of what is required to become bushfire prepared adds to the inherent uncertainty.

2.6.3.1 How people deal with uncertainty

When faced with uncertainty in everyday situations (e.g., what day the garbage bins are collected, how to remove wine stains from carpet) people consult information sources who they believe have relevant answers and are relatively accessible; therefore usually, these referents are family members, neighbours, and friends. As a result, when posed with an uncertain perceived threat like a bushfire, people will naturally turn to referents within their social environment that are reflective of their general everyday experiences.

As a result, people make sense and derive meaning of their experiences with reference to significant others (i.e., family, friends, neighbours) and their surrounding social environment (Miranda & Saunders, 2003). Through interaction, discourse and continued debate, people's behaviour is modified and shaped in order to conform to new and existing norms. Consequently, social interaction and discourse is fundamental to understanding how people interpret and act (or not act) on information. There are no grounds for assuming that people's decisions about whether or not to prepare are any different, and will consequently be influenced by similar social processes.

To understand the social and cognitive processes that influence individual decision making, researchers have turned to social cognitive theory and models. A summary of the main social cognitive theories and models utilised by previous health behaviour research is presented in the following chapter. The chapter concludes with a discussion of the social cognitive models that have been proposed to specifically explain adoption of preparedness measures for natural hazards, and presents the details of the present study's proposed theoretical Social Attachment Model of Bushfire Preparedness.

Chapter Three – The Social Cognitive Context of Bushfire Preparedness

3.1 Social Cognitive Models to Explain Preparedness Decision Making

As the above discussion illustrates, people's decisions to adopt certain behaviour is influenced by far more than just their perception of a threat. A considerably body of literature exists that demonstrates strong and consistent individual differences that account for behaviour change (e.g., gender, socio-economic status, culture; see Donovan, 2010; Eriksen, Gill, & Head, 2010; Heller et al., 2005; Sattler, Kaiser, & Hittner, 2000). However, the utility of these variables is questionable since they are not very open to change, and thus manipulation (Armitage & Conner, 2000).

As such, researchers have turned to social and cognitive variables to attempt to explain individual differences in health protective behaviour. This is of particular importance since psychological variables are relatively more amendable to change than socio-demographic variables. Therefore, social cognitive predictors of behaviour have been much used in the study of health protective behaviours and are increasingly being applied to hazard preparedness research (e.g., Martin, Bender, & Raish, 2007; Solberg et al., 2010; Weinstein, Lyon, Rothman, & Cuite, 2000).

In their review of social cognitive models and health behaviour, Armitage and Conner (2000) distinguish between three types of models that attempt to identify determinants of health protection behaviour. These are motivational, behavioural enaction, and multi-stage models of behaviour.

Motivational models portray the motivational factors that underpin people's decisions to adopt (or not adopt) health protective behaviours (e.g., protection motivation, threat perception). Models that come under this umbrella include the

Health Belief Model (Rosenstock, 1974), Protection Motivation Theory (Rogers, 1983), Social Cognitive Theory (Bandura, 1986), and the Theories of Reasoned Action (Fishbein & Ajzen, 1975) and Planned Behaviour (Ajzen, 1988). These motivational models of health behaviour have generally been successful in predicting adoption of health protective behaviours (e.g., smoking cessation, diet change, blood donation).

As these models attempt to explain the motivational influences of people's decisions to behave in a certain way, the dependent variable in the application of these models is often intention rather than the behaviour itself. Subsequently, these theories have been criticised for assuming a directional relationship from intention to actual behaviour (Armitage & Conner, 2000). These theories for example fail to account for an individuals' perceptions of their ability to attain their goal (e.g., 'I intend to go on a holiday to Europe but do not yet have enough leave accrued from work'), their commitment to attaining their goal (e.g., 'I would like to do *x*' versus 'achieving *x* is very important to me'), and other limitations such as cost, time, or perceived urgency. Although these motivational models of behaviour change do not explain the intention – action link they do offer an explanation of why people form certain intentions independent of attitudes towards personal ability and physical constraints. As such, the inclusion of intentions in the Social Attachment Model of Bushfire Preparedness provides an avenue for testing residents' beliefs independent of the constraints that prevent intention – action conversion.

Criticisms (e.g., Marks, 1996; Milne, Orbell, & Sheeran, 2002; Schwarzer & Fuchs, 1995) of the motivational models and the assumed intention – action conversion led to the development of 'behavioural enaction' models, which attempt to bridge the 'gap' between motivation and behaviour. These models, including

Gollwitzer's Implementation Intentions and Bagozzi's Goal Theory, seek to describe the processes that follow after people have formed behaviour intentions. These theories are described in the following sections.

Gollwitzer (1999) suggests that there are two forms of intention; goal intention and implementation intentions. Goal intention is focussed on intentions to perform certain behaviour or achieve a certain goal, whilst implementation intentions describe the plan as to when, where, and how the goal intention will become that action. As such, implementation intentions are represented by cues in the environment (i.e., 'I intend to initiate the goal-directed behaviour *x* when situation *y* happens'), and as a result implementation intentions sees control being passed to the environment. Therefore, Gollwitzer emphasised the importance of planning and suggests that goals do no directly result in action, but rather increase the likelihood that highly specific plans will be made, and it is these goals that will induce and sustain action.

Bagozzi's Goal Theory (1992) suggests that once goal intentions have been formed, 'trying' is the process that initiates and regulates intention to action. Trying is said to be a function of three processes: decisions with respect to means (e.g., self-confidence, likelihood of goal attainment, and the perception of pleasantness/unpleasantness), planning and control of goal-directed behaviour (a function of implementation intentions and monitoring of progress), and maintenance of commitment (the dispositional or purposive cognitions that are required to maintain or disengage from goal commitment).

Therefore, both Gollwitzer's and Bagozzi's models build upon the motivational models by attempting to explain how goal attainment transpires from

goal intentions (motivational variables). Similar to the motivational theories of behaviour change, these behavioural enaction models have been criticised for their lack of detail and thus practical utility in promoting positive behaviour change. Instead, numerous multi-stage models of behaviour change have been proposed by theorists in an attempt to account for the apparent multitude of factors influencing people's decision to adopt certain behaviour.

Multi-stage models of health behaviour, including the Transtheoretical Model of Change (Prochaska & DiClemente, 1983; Prochaska & DiClemente, 1992), Health Action Process Approach (HAPA) (Schwarzer, 1992; Schwarzer & Luszczynska, 2008), and the Person- Relative-to-Event Theory (PrE) (Mulilis & Duval, 1995), attempt to conceptualise health behaviour (change) as resulting from several discrete stages. These stage models therefore explain the process of behaviour change in more detail by describing factors that influence behaviour at various stages. As such, stage models imply that people at different stages will behave distinctively differently, and that the kinds of interventions and information needed to influence behaviour change will differ from stage to stage. For example, in Prochaska and DiClemente's (1992) Transtheoretical Model, which includes the five stages of pre-contemplation, contemplation, preparation, action, and maintenance, what influences progression from pre-contemplation to contemplation, will be different to the succession between action and maintenance.

In Schwarzer's (1992) HAPA model, two processes; a motivational phase and a volitional phase, are argued to account for the adoption, initiation, and maintenance of health protective behaviour. Similar to the motivational models discussed earlier, Schwarzer describes his motivational phases as consisting of self-efficacy and outcome expectancies, but maintains that these factors have a distinct

temporal and causal order in his model, with outcome expectancies seen as a precursor to self-efficacy in situations where people have prior experience with the behaviour. In cases where individuals lack previous experience with the behaviour, outcome expectancies can have a direct effect on intentions. Variables described such as threat (susceptibility by severity), which are a focal factors in motivational models like the health belief model, are seen as more distal antecedents of outcome expectancies. This therefore supports and reemphasises the view that such constructs only have weak predictive utility.

The volitional phase of Schwarzer's model extends the motivational phase of the other models to include three overlapping stages: planning, action, and maintenance. The planning stage, which describes how individuals imagine scenarios and how they would act, thus bridging the intention-action gap, is largely influenced by self-efficacy, that is, the individual's belief about their ability to achieve self-imposed challenges. What separates the HAPA from other behaviour models is its description of 'planning' as the mediator of the intention-behaviour relationship. In the HAPA, as opposed to the Theory of Planned Behaviour (Ajzen, 1988) and Gollwitzer's Implementation Intentions, planning explicates the causal relationship of intention to action and rather suggests that intention influences planning, which in turn influences behaviour (Armitage & Conner, 2000; Sutton, 2008).

The Person-Relative-to-Event (PrE) Theory of coping with threat (Mulilis & Duval, 1997) proposes that individuals, when faced with a potential harmful event, will simultaneously engage in activities that attempt to manage the situation (i.e., problem-focused coping) as well as direct efforts to regulating emotional reactions to the threatening situation (i.e., emotion-focused coping). Furthermore, two distinct

cognitive appraisal processes are suggested to influence the degree to which a person engages in problem-focused coping; appraisal of the potentially harmful event, and appraisal of personal resources relevant to threat management. Specifically, the PrE model suggests that an individual who appraises their "total coping resources as being sufficient in quality and quantity relative to the appraised magnitude of the threatening event will engage in more problem-focused coping activities than will a person whose coping resources are appraised as insufficient" (Mulilis & Duval, 1997, p. 1751). Therefore, as long as the individual perceives their available resources are sufficient, increasing perceived levels of threat will promote more problem-focused coping efforts. However, if perceived levels of threat are increased when considered resources are deemed insufficient, problem-focused coping efforts will decrease (Mulilis & Duval, 1997).

The three models described above have been used to predict intentions to perform health behaviours such as smoking cessation (e.g., DiClemente et al., 1991), exercise (e.g., Norman, Conner, & Bell, 2000; Scholz, Keller, & Perren, 2009), blood donation (e.g., Giles, McClenahan, Cairns, & Mallet, 2004), and improving dietary change (e.g., Curry, Kristal, & Bowen, 1992; Glanz et al., 1994; Schwarzer & Luszczynska, 2008). The above research thus demonstrates the successful application of social cognitive models to explain adoption health behaviours.

However, as discussed previously (see section 2.6.3), due to their unpredictability, natural hazards present an element of uncertainty which make the relatively straight forward cost/benefit analysis of most health behaviours (due to relatively predictable risks; e.g., quit smoking → improve ease of breathing, hair and nail condition) much more difficult and complex. As a result, residents who perceive a bushfire threat will inevitably turn to trusted sources of information to try and

reduce their uncertainty and anxiety. Therefore, in order to be able to predict what influences people's decision to adopt bushfire preparedness measures, social cognitive models must be able to accommodate factors that measure the degree of relationship between individuals, their community, and formal agencies. Therefore, the above described models are not appropriate, in their original form, to be applied in the current study to determine why people prepare (or do not prepare) for bushfires.

These social cognitive models have however been used to guide the development of more specific models of hazard preparedness. Over the past 40 years, hazard researchers have successfully applied models based on social cognitive theories to explain decisions to prepare for a multitude of natural hazards and demonstrate the utility of these models in all-hazards contexts (Paton, Smith, & Johnston, 2005; Solberg et al., 2010).

Rohrmann (2000) for example, applied a social cognitive approach to explicate a contextual framework for bushfire risk communication. In this approach he explained that it was not just the content of the information that was important, but also other internal characteristics and external social and environmental factors like the existing safety culture, prior risk perception, and influence of family and community. Rohrmann's 'provisional framework for the information-behaviour link' thus applies a social and cognitive approach to illustrate how individual cognitive processes (prior ability, cognitive beliefs, determination) do not alone influence whether information will be result in behaviour, but is rather a function of the individuals' interaction with their social environment (Rohrmann, 1995).

In a study of earthquake preparedness, Paton, et al. (2005) found that the reasoning process at-risk residents engaged in when deciding to ‘prepare’ or ‘not prepare’ was determined by two distinct sets of variables and thus not extreme ends of a preparation continuum. This finding was replicated by Paton, Bürgelt, and Prior (2008) who found that the social context within which people lived, and especially their level of community engagement was a major influence on whether they decided to prepare for bushfires or not. The researchers found that the residents who were more involved in community activities and had stronger community ties were more likely to initiate bushfire preparedness measures.

In recognition of the fact that natural hazards, the potential risks they pose, and what to do about this risk are at the mercy of everyday interpretive processes, has led other researchers to incorporate more mainstream aspects of social and environmental processes into models of preparedness behaviour. Such studies are consistently finding support for the important influence of everyday community and social processes of people’s interpretation of risk and decisions to adopt (or not adopt) hazard mitigation measures.

For example, Sagala, Okado, and Paton (2009), in their research on modelling social cognitive predictors of volcanic preparation in Indonesia, determined that individual-level factors were less important than everyday collective processes (e.g., community participation) and competencies (e.g., collective efficacy). Although these findings are reflective of the fact that in more culturally collectivist societies, preparedness, like most other normative behaviour, represents a collective activity, it has implications for basing disaster management and preparedness strategies worldwide on community engagement principles and utilising existing community networks to influence the actions of its members.

This position was supported by Paton, Smith, Daly, and Johnston's (2008) study of modelling the predictors of volcanic hazard preparedness in New Zealand. Although not as strong as the influence in the Indonesian sample, these authors also demonstrated the significant contribution of the community context (e.g., community participation and articulating problems) in influencing decisions to prepare. As such, the importance of the social or community context in influencing people's decision to prepare for hazards is not a collectivist cultural phenomenon, but rather seems just as applicable in Western societies. Moreover, the authors demonstrated a strong positive relationship between community participation and empowerment suggesting that when faced with complex and uncertain events, communities may not always be able to meet the needs of its members (e.g., reduce uncertainty by providing information and resources). In such circumstances, communities turn to civic agencies to fill the gap in their knowledge.

Paton et al.'s (2008) model therefore suggested that the relationship between emergency management agencies and their communities was a significant component of the social context in which residents' risk beliefs were made and enacted, and one that involved more than merely making information available. These findings led the authors to recommend that risk communication should be integrated with community development initiatives so to build the social competencies of the community (e.g., discussion of hazards, problem solving), promoting increased and sustained hazard preparedness. As a result, when emergency management agencies and communities play complementary roles in hazard risk management, community members' levels of trust, risk understanding and acceptance, satisfaction with communication, willingness to take responsibility

for their own safety, and commitment to prepare for natural disasters will increase (Paton, 2008).

These studies thus provide examples of how social cognitive models of behaviour have been applied to how individual cognitive factors, but especially social variables influence people's decisions to adopt hazard protective behaviour. These models can thus be used to help inform the development of a model of bushfire preparedness. However, what these models do not account for, and a phenomenon adding a unique complexity to what influences people's decision to prepare or not for bushfires, is the fact that people decide and purposely choose to live in environments which pose a bushfire risk. This makes it pertinent to consider whether this choice manifests itself in terms of the degree to which people feel a sense of attachment to where they live.

3.1.1 Attachment to 'place'

Natural landscapes, places, and spaces are more than just containers of natural resources, staging areas for enjoyable activities, a bit of ground on which to put a house, or the contributor of personal threat. They are locations filled with history, personal memories, and emotional and symbolic meaning. The symbolic meanings that a place may signify (from personal – childhood camping trips; to the publicly held – World heritage site) may cause individuals to form emotional bonds with the place in ways that result in place being incorporated into a person's sense of identity (Kyle, Graefe, & Manning, 2005; Williams & Vaske, 2003). The question is then whether this could have implications for how people relate to hazards in this environment and whether it influences how they respond to the associated risk.

For example, if people are attached to forested environments, how might their support for bushfire mitigation and preparedness measures which involve

reducing, removing, or altering the natural environment, be manipulated? There is evidence to suggest that bushfire preparedness can be met with resistance by residents who feel a sense of attachment to such areas (see for example Eriksen & Gill, 2010). This may explain why vegetation modification is one of the least favoured and adopted bushfire preparedness adjustments (see section 2.6.1.2). Alternatively, people with strong attachments to place may feel a greater desire to protect their (living) environment and therefore more likely to adopt bushfire preparedness measures (see for example Paton, Bürgelt, et al., 2008). This brief discussion introduces both the complexity that can arise from the way people relate to place and complexities and diversity in decision making that will occur around risk management and preparedness.

3.1.1.1 Place attachment

The issue alluded to above, the matter of residents actually choosing to live in the environments that are the cause of their relative risk, introduces a seemingly neglected aspect of hazard literature, and thus represents a focus of present study. People's attachment to the place they live, the subjective, emotional, and symbolic meanings they associate with these natural environments, places a great weight on how these residents in turn pay heed and interpret the risk information they receive. As a geographic term, 'place' commonly refers to a focus of meaning and felt value: "what begins as undifferentiated space becomes place when we endow it with value" (Tuan, 1977, p. 6). Defined by environmental psychologists, place attachment represents a positive connection or bond between an individual and a particular place (Low & Altman, 1992).

Although this phenomenon has been described by various terms (e.g., sense of place, rootedness, insidedness), the notions of affect, emotion, and feelings are

agreed to be central to the concept (Low & Altman, 1992). Accompanying these emotional characteristics however, are also cognitions (thought, knowledge, and belief) and practice (action and behaviour). This conceptualisation stresses the interaction of humans and places, and involves in the interplay of emotions and effect, knowledge and beliefs, and action and behaviour. As such, place attachment evolves through people's interaction with a space, and develops as they become family with the place and endow it with value (Kyle et al., 2005; Milligan, 1998). Others suggest that one of the reasons individuals assign importance to places (just as they do with activities, objects, and possessions) is that these places help identify themselves to others (Williams & Vaske, 2003); it helps answer the 'who am I?' question by answering the 'where am I?' question (Lai, Shafer, & Kyle, 2008).

In their mixed-method study of bushfire preparedness using an Australian sample, Paton, Bürgelt, and Prior (2008) determined through both quantitative and qualitative analyses of bushfire preparedness that one of the characteristics of the 'preparing' group was high attachment to place (e.g., strong attachment to home and property, strong environmental beliefs). These residents, whose environmental attachment was a salient aspect of their lifestyle, were happy to support/adopt measures with low environmental impact (e.g., mowing lawns, clearing ground litter). They were however reluctant to support any measures that would adversely affect their natural environment (e.g., clearing trees, controlled burns). As such, the authors suggested that attachment to place was related to bushfire preparedness, but only those measures which did not damage/effect those qualities of the living environment that they so valued. This therefore also provides further context for the earlier described common finding that residents are less likely to modify vegetation

on their property to increase their bushfire preparedness, and rather favour the adoption of more general property maintenance behaviour (see section 2.6.1.2).

Place attachment has also been found to influence collective preparedness behaviour and community involvement. Jakes, Kruger, et al., (2007, p. 194) found in their study of wildfire preparedness in the United States that people who felt attached to place were "moved to take individual and collective action to improve wildfire preparedness, to be stewards of the place that holds great personal significant". Similarly, Wandersman, Florin, Friedmann, and Meier's (1987) study of neighbourhood improvement groups in Israel and the United States, found that the members attributed attachment to their residential environment as one of the main reasons for their involvement.

Therefore, place attachment sentiments are not only held by individuals, but can also be collectively or consensually shared by families, community members, or even whole cultures (e.g., Jakes, Kruger, et al., 2007; Low & Altman, 1992). Others have suggested that attachment to a place can also be based on or incorporate other people including family, friends, other community members, or even culture (Kyle et al., 2005; Low & Altman, 1992; Williams & Vaske, 2003). As such, the social relationship that a place denotes may be the focus or at least incorporated in the individual's attachment. Therefore, the role of attachment to place appears to be complex and integral to individuals' bushfire preparedness decision making, if not at the individual level, then at the social level (and most likely both). For this reason, attachment to place represents a focus of this research.

Discussion thus far has demonstrated how social cognitive models of behaviour have been successfully applied (e.g., Paton, Smith, et al., 2008; Paton et al., 2005; Rohrmann, 1995; Sagala et al., 2009) to explain how individual (e.g., cognitive biases, cost-benefit analysis) and especially social factors influence whether residents at risk of natural hazards adopt preparedness measures. Whether residents act on the hazard information that has been provided to them has been consistently shown to be a function of influential processes within their social environment. As such, in developing a model of bushfire preparedness, these social factors, including residents' sense of community and their involvement within their community must be accounted for.

Furthermore, the unique element of the bushfire hazard that sees residents actively choosing to live in areas that pose the greatest bushfire risks, suggests that such a model must include the seemingly pivotal role of place attachment in explaining residents' bushfire preparedness decision making processes. The present study therefore provides a unique contribution to hazards literature by incorporating and proposing place attachment as a pre-motivational factor that influences whether residents decide to prepare for bushfire or not. Specifically, the present study proposes (as will be outlined in the following section) that the nature of residents' place attachment will act as an essential precursor to their subsequent bushfire preparedness decision making and thus represents the starting point in the Social Attachment Model of Bushfire Preparedness. This model is introduced and described in the following section.

3.2 Place and Bushfire Preparedness: Developing a New Conceptualisation

The proposed theoretical Social Attachment Model of Bushfire Preparedness argues that it is pertinent to explore behaviour change from an environmental perspective and uses this to offer an explanation for how people, communities, and emergency management agencies interact to influence people's decisions to prepare for bushfire. The Model proposes that people's decision to prepare, or not prepare, is influenced by a sequential series of interpretive competencies and characteristics that collectively contribute to the preparation processes. The Model suggests that this process begins with understanding people's environmental relationships as defined by people's level of attachment to place; including both the natural and social environments that make up that place, and the way value judgements about this place affects their willingness to pay regard to bushfire risk and preparation information. This will be discussed in more detail in the subsequent section.

Following from the individual's appraisal of their attachment to place and what this means, comes their own beliefs regarding the costs and benefits of adopting hazard mitigating behaviours. If people believe that regardless of the measures they take, the effects of the hazard will be unsurmountable, they are unlikely to even consider adopting preparedness measures (negative outcome expectancy; discussed in more detail below). If however, people hold positive outcome expectancies, or believe that by adopting certain mitigation behaviours they can reduce the negative consequences of natural hazards, progression to the next stage is initiated.

This next social stage explores the role of the wider community in providing local knowledge and support networks which act to influence risk belief as well as reduce the uncertainty surrounding the hazard. It is unlikely that the community will

be able to provide all the information and resources required to lessen the uncertainty surrounding the infrequent hazard event and as such, the Model incorporates the relationship that these communities will have to forge with formal emergency management agencies. The quality of the information and the communities' ability to make sense of it, will dictate the quality of this relationship. Empowerment and trust are thus the mediating factors between community processes and the agencies. Whether people's intention to adopt preparedness measures actually result in action is predicted to be mediated by their perception of whose responsibility it is to ensure householder preparedness. This model provides the framework for the quantitative component of this study, and therefore the individual, community and agency processes that are incorporated in the Model are discussed in more detail in the following sections.

3.2.1 Individual factors

Drawing on a sample of residents living in bushfire-risk communities around Hobart, Tasmania, Paton, Bürgelt, and Prior's (2008) mixed-method study of bushfire preparedness identified high attachment to place as an important influence on residents' decisions to adopt certain preparedness measures. In contrast, this study also found that people who were not attached to where they lived cited this as a fundamental reason for deciding not to prepare at all. This suggests that place attachment may be a pivotal construct in how people make choices about whether or not to prepare.

Place attachment, as conceptualised earlier, evolves through people's interaction with a space, and develops as they become familiar with the place and endow it with value (Kyle et al., 2005; Milligan, 1998). Place attachment is also described as an important component of people's identity (Williams & Vaske, 2003),

helping to answer the ‘who am I?’ question by answering the ‘where am I?’ question. Attachment to place has thus been described as a cognitive structure which contributes to an individual’s social identity and process of global self-categorisation (Pretty, Chipuer, & Bramston, 2003). Attempts to operationalise the construct as unidimensional continue to fail, and rather it is generally agreed to consist of two dimensions; place dependence and place identity (Kyle et al., 2005; Lai et al., 2008; Williams & Roggenbuck, 1989; Williams & Vaske, 2003).

Place dependence (a functional attachment) defines the importance of a place in providing features and conditions that support desired activities or specific goals of an individual (Kyle et al., 2005; Williams & Roggenbuck, 1989; Williams & Vaske, 2003). In other words, the place’s physical characteristics are valued due to their ability to facilitate desired experiences (e.g., good bushwalking tracks, accessible rock climbing roots). This place dependence may increase as a function of proximity, as it allows more frequent visitation. Place dependence therefore suggests an ongoing relationship with a particular physical setting (Kyle et al., 2005; Williams & Vaske, 2003)

Place identity (an emotional attachment) is defined by Proshansky (1978, p. 155) “as those dimensions of self that define the individual’s personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideals, beliefs, preferences, feelings, values, goals, and behavioural tendencies and skills relevant to this environment”. As such, place identity has been described as a component of self-identity that promotes self-esteem (Korpela, 1989), enhances feelings of belonging to one’s community (Tuan, 1977), and as a vital component when communicating about environmental values and policies (Cantrill, 1998). Although place identity can manifest as a result of repeated visitation with a

particular place, place identity does not necessarily result from a particular experience with a place. Rather, place attachment generally involves a psychological investment on the part of the person and usually develops over time (Williams & Vaske, 2003).

As a result, place identity evolves from locating oneself within an environment, both in day-to-day contexts as well as during exceptional circumstances (e.g., natural disasters). Therefore, the community a resident feels they belong to may be defined by the environment it is situated in and as such, the images of the place may constitute an extension of the self (Proshansky, Fabian, & Kaminoff, 1983). Attachment to the physical environment within which people live has been identified by other researchers to influence decisions to prepare for natural disasters (Eriksen & Gill, 2010; Jakes, Kruger, et al., 2007; Martin, Martin, & Kent, 2009; Paton, Bürgelt, et al., 2008). This is particularly pertinent to the present study whose sample consisted largely of residents living in peri-urban communities in Tasmania. Residents living in such communities most likely consider their interaction with the natural environment an important lifestyle factor and contributor to their decision to reside in the community in the first place.

It was therefore hypothesised that attachment to place (including the dimensions of place dependence and place identity) would represent the starting point in the decision making process to adopt bushfire preparedness measures. As the proposed principle antecedent, it was argued that it would precede whether residents engaged in the cost/benefit analysis of adopting certain bushfire protective measures (outcome expectancy). That is, judgements about levels of connectedness to their natural environment would drive whether they engaged in thinking about the

costs and benefits of managing risk (e.g., support for mitigation actions such as clearing, burning off and household preparing).

While taking a different approach to conceptualising preparedness, that is, that it is embedded in people's relationship with their environment, it is also important to consider how variables that are empirically validated fit in the proposed model. Taking place as the starting point can affect the values people attribute to certain mitigation and preparedness actions. For example, it could be anticipated that the kinds of pro-environmental attitudes that could accompany attachment to place would undermine support for clearing (e.g., controlled burning by agencies or the creation of a defensible space). However, place attachment would not in itself predict people's beliefs about the efficacy or otherwise of these actions. Consequently, it is pertinent to include in the proposed model of bushfire preparedness outcome expectancy variables. It is therefore argued that individuals' judgements regarding the cost and benefits (captured by 'outcomes expectancy') associated with actions will influence the choices people make about adopting protective measures.

Outcome expectancies are described as the perceptions a person has in terms of whether they believe their personal actions will effectively mitigate or reduce a problem (Paton, 2003). As such, a distinction is made between positive outcome expectancies, or the belief that personal preparation can be effective and add value to one's life (benefit > costs), and negative outcome expectancy; the belief that hazards are too destructive for personal action to have any effect (cost > benefit) (Paton et al., 2005). Both positive and negative outcome expectancy have been found to predict intentions to prepare (e.g., Paton, 2008; Paton, Bürgelt, et al., 2008) and actual preparedness (Paton, Bürgelt, et al., 2008). Therefore, in the proposed model of bushfire preparedness, negative outcome expectancy was hypothesised to

negatively predict actual bushfire preparedness (i.e., explain why people do not adopt bushfire preparedness measures), whilst positive outcome expectancy was expected to predict intention to prepare and actual preparedness (see Figure 2).

Based on previous research (e.g., Paton, Bürgelt, et al., 2008), although residents with high place attachment may be reluctant to adopt certain preparedness measures such as burning off or felling native vegetation, it was predicted that they would be more likely adopt other recommended bushfire preparedness measures such as having a fire plan, independent water sources, fire pump and emergency survival kit so to not only protect the environment they value so greatly, but to protect their ability to continue to live and experience this environment.

As well as destroying homes and possessions, bushfires can provoke sensations of 'loss of place' for affected individuals as everything these places symbolised, including family memories, inter-generational continuity and personal investment, is also lost (Carballo, Heal, & Horbaty, 2006). Furthermore, due to their attachment to place, their positive attitudes and high value judgements of the natural environment, these individuals may have immense confidence in their environments ability to provide protection from negative bushfire consequences (e.g., green vegetation is poor fuel, trees can catch embers). As such, it was hypothesised that people with high attachment to place would be more likely to form positive outcome expectancies.

As suggested earlier, place attachment may represent a component of an individual's self-identity, and it has even been suggested that families, communities, and even cultures collectively share place attachments. As place attachment develops through an individual's interaction with the place, and therefore the elements within

it including other people who share a similar attachment to the place (Kyle et al., 2005), place attachment is an important component of social and community processes. Furthermore, since individuals' sentiments towards a neighbourhood are affected by their social investment within their neighbourhood, residents who have more close friends within that neighbourhood would feel a stronger attachment to that neighbourhood. As Wandersman et al.'s (1987) study demonstrated, residents became involved in community groups because of the attachment they felt to their residential environment. As such, it was predicted that there would be strong association between place attachment and the social variables of sense of community and community involvement (Mesch & Manor, 1998). Specifically, it was hypothesised that high attachment to place would predict greater sense of community and community involvement (see Figure 2 for proposed Model).

3.2.2 Community factors

Even though people may believe in the efficacy of adopting hazard mitigating behaviour, they may not, given the inherent uncertainty associated with bushfire occurrence, possess the relevant knowledge or resources to be able to carry out the necessary actions. When people are faced with the unknown or uncertainty, they turn to the people they trust and who they perceive as being in similar situations to themselves, as the information those people can provide, will be directly relevant to their own situation (Paton, 2007a, 2008). Consequently, people usually turn to family, friends, or other community members first, before expert or agency sources for their information. In terms of bushfire risk, consulting referents who share similar physical locality or place is particularly important as these residents not only share a similar physical threat, therefore being able to impart context specific information, but also have a common sense of shared fate (e.g., live in bushfire risk area).

Therefore, people's involvement in and attachment to their community and frequency of interaction, are important constructs in terms of predicting people's preparedness decisions.

Sense of community, defined as consisting of four dimensions; membership, influence, shared emotional connection, and needs fulfilment (McMillan & Chavis, 1986), describes the feelings of belonging and attachment a person has for the people and place in which they live (Bachrach & Zautra, 1985). Sense of community assumes the existence of a complex social network that provides its members with social support and resources. In terms of self-identity, the 'who am I?' question, it answers the 'who am I related to?' question, and as such is a powerful social construct that holds a persuasive force over its members. Sense of community, by way of sharing stories of bushfires and dealing with adversity, enhances knowledge about the local history of bushfires, fosters a more realistic expectation about bushfires in their area, and promotes a greater acceptance of the importance of preparing for bushfires.

Sense of community has also been described in the resilience literature as an important attribute in ensuring that a community's response following a disaster is a collective one, and increases access to and utilises social support networks (Paton, Johnston, Smith, & Millar, 2001). In contrast, people who perceive themselves as having no investment in their community will, it can be hypothesised, be less likely to consider community problems as relevant and thus will not become involved in community affairs (Bachrach & Zautra, 1985). As such, sense of community has been implemented as a factor that links intentions and preparation.

In a study on bushfire preparedness, and based on a factor analysis of a sense of community measure, Paton, Bürgelt, and Prior (2008) determined that sense of community could be sub-divided into sense of belonging to a place and sense of belonging to people. Only 'sense of belonging to place' mediated the relationship between positive outcome expectancies and both intention to prepare and actual bushfire preparedness, further supporting this study's presumption of place as a fundamental motivator of bushfire preparedness. 'Sense of belonging to people' on the other hand, or information from people with similar values and interests gained from routine social contacts, was suggested to act as a collective problem solving tool aiding individual preparedness decisions. Similarly, Paton, Kelly, Bürgelt, and Doherty (2006) found that sense of community predicted both whether people would or would not prepare. It is possible that this could be linked to the findings on place attachment discussed earlier. Following a factor analysis of the sense of community measure, Paton, Bürgelt et al. (2008) found that it comprised items that were comparable to place attachment. The finding that sense of community could predict both outcomes could reflect people's views on their relationship with their environment. Sense of community has also been found to directly influence problem-focused coping and collective action in communities developing strategies to confront hazardous waste issues (Bachrach & Zautra, 1985). This suggests that having a sense of belonging to others provides a foundation for collaboration with 'like-minded' others in ways that facilitates people becoming involved with others.

Community involvement, as described by Paton (2007b), is the active participation of residents in their community (e.g., volunteering for community activities, or attending community functions or meetings). What people perceive as being salient issues and their perception of potential risks and how to confront them

is largely influenced by the views of others who share similar values (Earle, 2004; Lion et al., 2002; Poortinga & Pidgeon, 2004). Therefore, the measure of community involvement is particularly useful in hazard preparedness research, because it is argued that participating with others in the community provides access to information from others whose beliefs and expectations are consistent with their own (Paton, 2008; Zimmerman, 1990).

Zimmerman (1990) suggested that involvement in community activities, which are initiated and controlled by grassroots leaders, offers the participants the benefits of reciprocal learning and a setting for social support, thereby fostering a sense of community. This involvement thus enhances perceived control and reduces alienation, resulting in an increased sense of empowerment. Zimmerman (1990), in testing his model of learned hopefulness, determined through structural equation modeling (discussed in Chapter 4) that participation in community organisations had a direct and positive effect on psychological empowerment.

Jakes et al. (2007, p. 195) came to a similar conclusion in their case studies of wildfire preparedness in United States' communities. They suggest that the "ability of local citizens to apply their knowledge and skills to community wildfire preparedness demonstrates the value of the individual to the overall process, and empowers others within the community to become involved." Therefore, by witnessing the effect of their collective ability to enhance wildfire preparedness, respondents felt an overall sense that something could be done to mitigate the hazard, and that this power was held by them as a community.

The present study therefore predicted that the measure of sense of community and community involvement would mediate the relationship between place attachment and intentions to prepare through means of empowerment.

3.2.3 Societal factors

In the process of identifying possible bushfire hazard consequences and potential solutions, particularly as the infrequent nature of bushfire events prevents direct acquisition of relevant knowledge and resources, community members may find that they are required to seek the information and resources needed to confront these problems are not available and must therefore look to expert sources. However, the capacity for the community to understand and implement any information expert agencies provide depends on the degree to which external sources empower (e.g., increase perceived control, provide avenues for social support) community members by providing information and resources that meets people's needs and helps them put plans into action. Paton (2008) described empowerment in the hazard context as a measure of residents' ability to gain mastery over their affairs and confront environmental issues by being supported by agencies, and not having solutions thrust upon them or being told what to do. As such, one of the key concepts of empowerment is advocating the equitable distribution of resources (material, social, knowledge, peer helping, and belongingness) in order to maintain social justice, sense of community, and develop the community's capacity to solve problems, whether to do with natural hazards or not.

Therefore, in the context of risk communication, empowerment can contribute to explaining the degree to which residents perceive that their experience with a source of information, in this case emergency management agencies, has facilitated their ability solve their problems and achieve their specific goals (Paton,

2007b, 2008). This highlights the importance that past experience plays in developing peoples' expectations of others' (e.g., fire agency members) future behaviour and intentions. This is important for risk communication. If a community has not had a positive or empowering experience with an emergency management agency in the past; it is unlikely that they will trust their capability in the future. As such, the degree to which people perceive their having a history of being empowered by a source (e.g., fire agency), especially when faced with uncertainty, will influence trust (Paton, 2008).

Although trust does not always influence decision making, in situations of uncertainty and where there is a lack of knowledge regarding the source of the uncertainty (e.g., infrequent bushfires), trust is suggested to be very important (Earle & Cvetkovich, 1995). Under conditions of uncertainty, people's decision making is influenced more by their assessment of their trust in the source of information rather than the hazard risk information provided by that source (Siegrist & Cvetkovich, 2000). Additionally, the more ambiguous, novel, and less structured the risk context is, the more people will rely on their general trust beliefs about, and their past experience with, the source of that information (Johnson-George & Swap, 1982; Luhmann, 1979; Sjoberg, 1999; Worchel, 1979). Due to the relatively infrequent nature of most natural hazards, when actually faced with the uncertainty such an event poses, people often have to rely on sources of information (e.g., emergency planners) with who they have an existing general relationship (e.g., local council officers who also have emergency management portfolios) that is independent of and extends beyond natural hazard issues. As such, the quality of the relationship and trust that has developed between residents and emergency service providers in everyday contexts (e.g., residents' general attitudes towards the local council or fire

service) may be an important determinant of trust in the context of risk communication regarding infrequent natural hazard events (Paton, 2008).

With respect to whether trust influences peoples' decision making, two aspects of the situation are particularly important (Luhmann, 1979; Mayer, Davis, & Schoorman, 1995). The first concerns the degree of familiarity with a situation. The second involves the amount, quality and availability of information relevant to the situation that people themselves possess.

Under conditions of high familiarity/high information, an individual has access to well structured, plentiful and meaningful information which can be used to inform a course of action. Under conditions of low familiarity/low information, people will have little or no structured information to guide their decision. Under these circumstances, decisions are likely to be based on a general disposition of trust derived from people's generalised past trust experiences with that information source (Luhmann, 1979; Siegrist & Cvetkovich, 2000).

The importance of trust, according to this view, is inversely related to people's familiarity with the hazard and the availability of information about it. As frequency and experience increase, the more information will be directly available to the person or accessible from within their community, negating the need to acquire and evaluate information from other sources. In unfamiliar or novel situations, in which reliance upon external expert sources is greater, people's decisions about what to do will be mediated by trust in the source of information.

In a study of student knowledge and perceived cost/benefit of various hazard technologies, Siegrist and Cvetkovich (2000) determined that in the absence of knowledge, decisions and judgement about a hazardous technology was guided by

social trust. However, trust was not a contributing factor in the assessment of costs and benefits of technologies that were familiar to the participants. Siegrist and Cvetkovich therefore concluded that "trust is an important determinant in judgements of risks in the absence of knowledge" (2000, p. 717).

These findings were supported by Paton (2008) who found in his study of high familiarity/ high information condition (bushfires in Hobart and Canberra) that trust in emergency providers was not a significant predictor of intention to prepare. On the contrary, in the low familiarity/low information condition (earthquakes in Napier, New Zealand), trust did significantly predict intentions to prepare. Paton further found that both empowerment and articulating problems influenced trust when the Model was applied to volcanic scenario in Auckland.

Paton et al. (2009) emphasised that if emergency agencies can empower communities the level of trust in the agencies is likely to benefit and increase the likelihood of people acting on provided risk mitigation information. The researchers found that empowerment also moderated the relationship between community involvement and trust. Furthermore, in their study of tsunami preparedness in a low familiarity Alaskan community (Paton et al., 2009), they found that empowerment mediated the relationship between community involvement and intentions to prepare for hazards.

This suggests that in conditions of uncertainty, providing community members with an empowering setting that facilitates residents' ability to interact and solve local problems will empower them to procure their own solutions to the bushfire threat and positively influence the community's preparedness and future resilience to natural hazards. As such, in the present study it was hypothesised that

empowerment would moderate the relationship between the community processes (including sense of community and community involvement) and trust. Based on Paton's (2008) research, it was further predicted that trust would moderate the relationship between empowerment and intention to prepare.

Understanding what influences intentions to prepare (and not prepare) is of great interest to researchers and emergency agencies alike, as such information can be used to promote the formation of preparedness intentions, and thus influence actual adoption of preparedness measures. However, testing preparedness models in low familiarity/low knowledge scenarios presents a challenge for measuring an appropriate outcome variable, because it is unlikely that any preparation adjustments have actually been adopted. Therefore, intention to prepare is commonly used as the dependent variable in such studies and has been found to be a strong predictor of actual preparedness (e.g. Paton, Houghton et al., 2008; Paton et al., 2006; Paton et al., 2005; Lindell & Perry, 2000). Furthermore, researchers often include intentions to prepare as a predictor of actual preparedness in studies of high familiarity/high knowledge scenarios as it offers an insight into what influences preparedness action once the intentions have been formed.

The outcome measure of the present study will be actual preparedness (i.e., what preparedness behaviour has actually been adopted) (see Appendix A for Bushfire Preparedness Questionnaire). Although major bushfires occur infrequently in Tasmania, bushfires do occur seasonally and thus it was expected that some residents would adopt some level of bushfire preparedness. Intention to prepare will also be measured as this will hopefully shed light on why some people, although they believe that bushfires are a salient risk, and believe in the efficacy of preparing

for such a risk, still do not prepare. That is, they intend to prepare, but due to limitations such as cost and time, never actually adopt protective measures.

Measuring intentions to prepare also distinguish between hazard preparedness activities that are undertaken as part of everyday activities (e.g., mowing the lawns) rather than being indicative of conscious decisions to prepare. For example, in a study of cyclone preparedness, Anderson-Berry (2003) found that although residents stated that they had cleared up their yards (to reduce risk of household items becoming airborne missiles during a cyclone), this was initiated not by purposeful decisions to reduce negative consequences from cyclones but in response to the local council's Christmas clean-up campaign. Thus, intentions provide additional opportunities to investigate interpretive processes and how people impose meaning on experiences. It also provides an opportunity to hypothesis about other interpretive processes.

Another variable that has to be included in a study in which people, communities and agencies all play a part concerns beliefs about responsibility for preparing. If people assume hazard preparedness is the responsibility of risk management officials, they may be less likely to heed warning information, follow emergency response advice or plans, or adopt personal protective behaviours, compared to those individuals who take responsibility upon themselves (Bird, Gisladottir, & Dominey-Howes, 2010; Gregg et al., 2004; Lindell & Whitney, 2000; Martin et al., 2009; Mulilis & Duval, 1997; Perry & Lindell, 2008). This measure is particularly pertinent to the Tasmanian sample as market research conducted by an independent research body (Enterprise Marketing and Research Services, 2010) for the Tasmania Fire Service indicated that almost half (47%) of the residents interviewed (400 residents from four communities) in November 2010 continued to

place “very high” or “high” reliance on the fire service to defend their homes in the event of a bushfire (compared to 47% in February 2010, 48% in November 2009, 57% in 2008 and 41% in February 2009).

People who do perceive hazard preparedness as their responsibility may only adopt the appropriate behaviours if they have a positive outcome expectancy (i.e., believe that personal preparation will reduce negative hazard consequences and add value to one’s life) and feel a sense of personal control over the potential situation and consequences (e.g., clear vegetation to reduce risk; Schlenker, Britt, Pennington, Murphy, & Doherty, 1994), and whose social environment has prompted them to formulate intentions to prepare (Paton & Johnston, 2001). As such, it was hypothesised that responsibility would mediate the path between positive outcome expectancy, intention to prepare, and actual bushfire preparedness (see Figure 2).

The Social Attachment Model of Bushfire Preparedness proposed in the present study therefore offers a unique contribution to natural hazards research by incorporating the suggested fundamental role of place attachment as an antecedent in the individual’s bushfire preparedness decision making process. In other words, place attachment, or residents’ bond with their environment and the elements within it, was proposed to predict residents’ level of positive outcome expectancy, community involvement and sense of community, which in turn through the interaction with agencies and facilitation of feelings of empowerment and trust, would predict intentions to prepare for bushfires (Figure 2).The Model also contributes to hazard preparedness literature by proposing the mediating role of individual sense of responsibility in predicting intentions to prepare actually manifesting to actual preparedness. As such, the proposed Social Attachment Model

of Bushfire Preparedness suggests that the intention – action link is bridged by residents' feeling of personal responsibility for ensuring they are prepared.

Therefore, the present study's first aim was to test the proposed theoretical Model (Figure 2) on a sample of Tasmanian residents living in areas at risk of bushfire. If the Model provided a good fit to the data, that is, was able to successfully explain the variance in the data, it would provide support for the importance of place attachment sentiments in individuals' bushfire preparedness decision making. Such a finding would provide a novel contribution to the natural hazard literature and aid emergency management agencies in developing and implementing more effective risk communication and hazard education policies and programs.

The question of how such a model can be practically applied to real-world scenarios, and thus bridge the theory – practice divide, therefore represents the ensuing issue. The approach proposed to offer the most appropriate and effective application of the Social Attachment Model of Bushfire Preparedness is described in the following section.

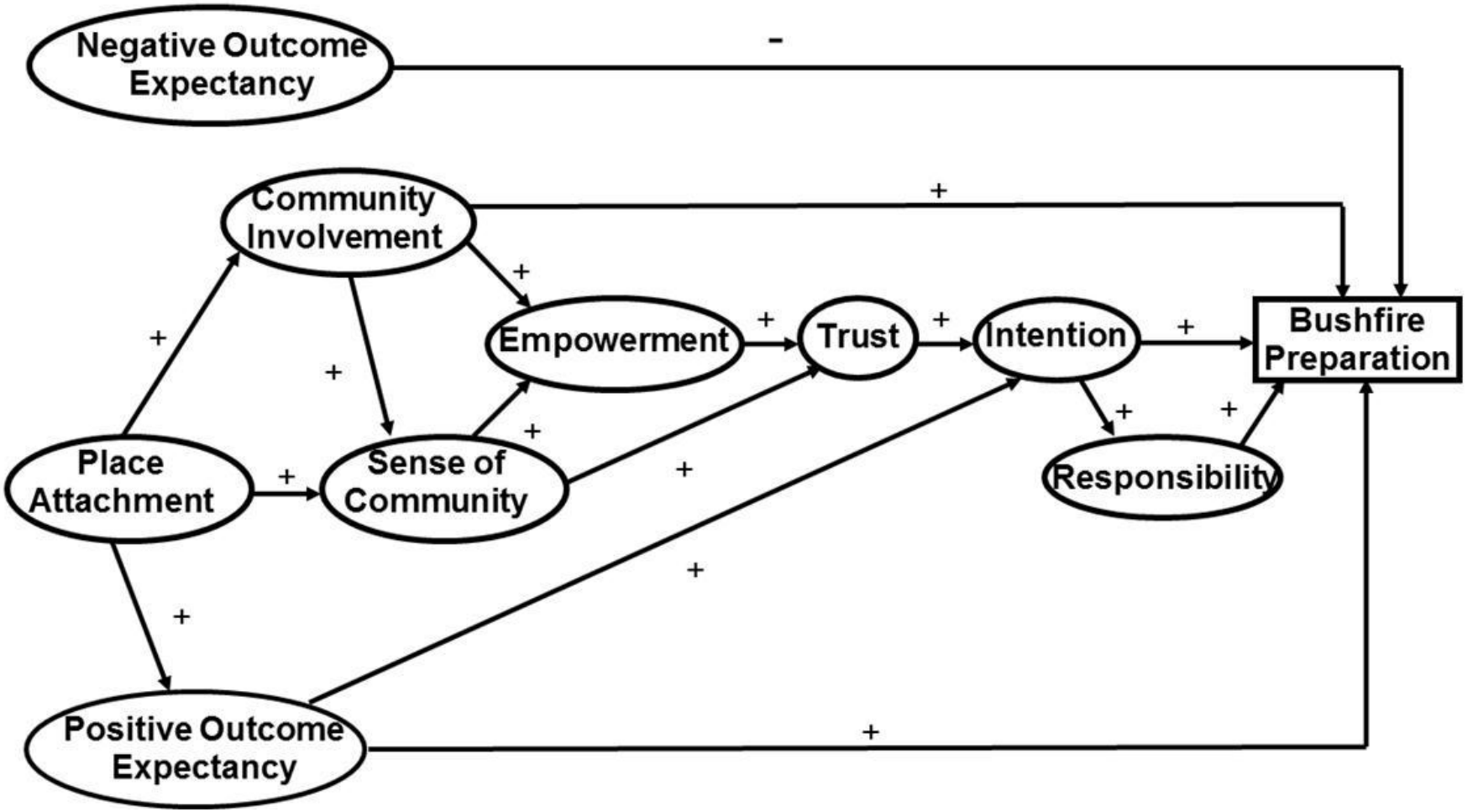

Figure 2. The proposed theoretical Social Attachment Model of Bushfire Preparedness.

3.3 Bridging the Theory-Practice Divide

Proposing a new model of interpreting and predicting bushfire preparedness decision making requires the adoption of a new approach to risk communication and bushfire education practices. As was explored in section 2.6.1 earlier, the current traditional approach to promoting bushfire preparedness is not effective. One of the main reasons for this is the failure to accommodate the individual, but especially social processes, which influence how risk information is interpreted. As such, in order to effectively implement the proposed Social Attachment Model of Bushfire Preparedness, a new community education approach that accommodates these processes is needed.

One method to achieving this, a method that has been consistently advocated by hazards research of the last decade and is consequently beginning to be adopted by emergency management agencies, is adopting a community engagement approach (e.g., Jakes, Kruger, et al., 2007; Jakes et al., 2003; McGee, 2011).

3.3.1 Principles of community engagement

The community engagement approach is a two-way process between agencies and communities built on empowerment principles (Wandersman et al., 1987) that enable and promote a partnership to facilitate positive change. Although no one ‘best practice’ of community engagement exists (Cavaye, 2005), assumptions and certain practices do need to be met in order to ‘do’ community engagement (Paton & Johnston, 2001)

The basic assumption of community engagement is that in order to facilitate sustainable positive change, communities must become empowered to identify community problems and develop strategies to solve and contain these problems

using their own resources and competencies. However, particularly under conditions of uncertainty, communities it is argued that communities need to operate within empowering settings, that define the relationship between communities and agencies with appropriate resources and information, to facilitate opportunities for communities to identify collective issues and problem-solve solutions (based on consensus) that are consistent with communities' needs, systems, and values. Through participation in identifying shared problems and implementing solutions to them, the community and its residents develop problem-focussed coping skills, an increased sense of community, and a collective commitment to action (Paton & Johnston, 2001). As such, through actively dealing with salient issues, a sense of collective efficacy is established which will facilitate the community's resilience to future challenges (Paton, 2006; de Terte, Becker, & Stephens, 2009; Prichard & Gow, 2008).

The premise of this approach then is that agencies adopt a supporting and facilitating role, providing guidance and resources (e.g., contacts, information), but ultimately allow the community themselves to drive the change process. In this context, emergency management agencies thus act as consultants to communities rather than orchestrators of this change process (Paton, 2006). In this way, whatever the problem and identified solution strategy may be, its maintenance and sustainability is more likely since it has come from the community themselves (thus the importance of solution strategies being based as far as possible on consensus). If agencies provide an empowering setting (i.e., provide opportunities for bottom-up, community participation in problem solving and provide the guidance and resources required for communities to take responsibility for enacting plans) that complements

community capabilities, a partnership built on trust and mutual respect will develop between the agency and community.

Adopting a community engagement approach therefore provides an appropriate method for delivering the theoretical assumptions of the Social Attachment Model of Bushfire Preparedness (Figure 2) proposed by the present study. This is congruent with the recommendations of the majority of natural hazards literature which has been advocating for a shift from the traditional information dissemination approach of community education to a community engagement to natural hazard preparedness education (Bushnell & Cottrell, 2007; Elsworth, Gilbert, Rhodes, & Goodman, 2009; Eriksen & Gill, 2010; Eriksen et al., 2010; Frandsen, 2011; Jakes, Kruger, et al., 2007; Paton, 2007b; Paton, Smith, et al., 2008; Prior & Paton, 2008).

3.3.2 Australian fire agencies' 'community engagement' examples

Due to the consistent recommendations by hazards research for agencies to adopt a community engagement approach to preparedness education, it is becoming increasingly popular by some fire agencies in Australia to implement community engagement programs and initiatives. As a way of providing examples of how 'community engagement' has been conceptualised, used, and misused by fire agencies, the website of each state and territories' fire service was searched.

Although it is acknowledged that websites do not always offer accurate or up-to-date information, searching these websites provided an effective way of comparing the different types of community education programs available. Searching a fire agency's website arguably also reflects what a resident may do if trying to obtain more information about their fire service's available programs.

Provided below is therefore a summary of the community education and engagement activities offered by each state and territory's fire agency as reflected by their website. This 'search' was conducted on the 16th of December, 2011 and thus reflects the start or early part of the bushfire season (e.g., Tasmania's bushfire season was officially launched on the 17th of December, in 2011), and therefore also the peak usage period of the website.

A common approach to 'community engagement' is to provide the same preparedness information/education (traditional information dissemination strategy) but to the 'community level'. This form of 'community engagement' thus often manifests in the fire agencies taking their bushfire education presentations to smaller communities (e.g., community halls, neighbourhood groups). This is an approach adopted by the Northern Territory's Fire and Rescue Service. This agency have a Community Fire Safety Branch which offer bushfire education presentations to community groups as well as run a school based education program (Northern Territory Fire and Rescue Service, 2011). This however, is the same traditional model of information dissemination and does not seek to engage with the community to determine how the community can best be empowered to adopt improved bushfire preparedness measures.

Other fire agencies have developed community group or local action programs that provide home fire safety templates aimed at fostering resilient communities by encouraging local residents to work together prepare for bushfire by facilitating networking opportunities and providing bushfire preparedness education. Such programs have been adopted by Western Australia's (WA) Fire and Emergency Services Authority (FESA) (2011) and Queensland's Fire and Rescue Service (Rural Fire Service, 2011a). However, the link to the Queensland Fire and Rescue Service's

bushfire prepared communities program does not work http://www.fire.qld.gov.au/communitysafety/bushfire/default.asp – last checked 24 February, 2012) questioning whether this program is in actual fact available.

Probably the most renowned/widely implemented community bushfire group template, developed by an Australian fire agency, is Community Fireguard developed by the Victoria's Country Fire Authority (CFA). The Community Fireguard program consists of small groups of neighbours who learn about bushfire risk and how to prepare for bushfires through the facilitation of trained CFA members. Initial theory and practical sessions with the facilitators provide these Fireguard members with the knowledge and skills to prepare for bushfires, however after this initial training, groups usually stay in touch independently of the CFA through phone trees and/or annual meetings. In this way community members maintain their level of bushfire preparedness via the membership of this Community Fireguard group (Country Fire Authority, 2011).

Developed in 1993 (Gilbert & Marsh, 2009), this template was also adopted by other fire agencies including Western Australia's FESA and the Tasmania Fire Service. In this way, the agencies provided communities with an empowering setting, by providing them with resources (specific information on how to prepare for bushfires) and building on their capacity to work together as a community (through increased opportunity to participate in group activities) to increase and maintain their level of bushfire preparedness.

More recently emergency management and fire agencies have established dedicated community engagement units to develop and facilitate community engagement programs.

In New South Wales (NSW) the Rural Fire Service's (RFS) dedicated community engagement unit not only supports trained community engagement facilitators who work within the community but host an annual conference on community engagement and fire awareness. This unit, whose position is to work "with the communities of NSW to build resilience to bushfires before, during and after a bushfire event" (Rural Fire Service, 2011b), also has a Facebook profile (http://www.facebook.com/#!/nswrfscommunityengagers) and blog (NSW Rural Fire Service, 2011) for its members. In this way the RFS has not only used community engagement as its principle means of promoting community bushfire preparedness, but actively engages its volunteer fire fighters to provide support and training in community engagement principles. This acknowledges the fact that not only is community engagement a new approach for fire services whose culture reflects an authoritarian and top-down information provision service, but that actually engaging with communities is very difficult. 'Doing' community engagement requires volunteer fire brigade members to be proficient in conflict resolution, negotiation, delegation, and generally, human resource management skills. The RFS supports and engages its members to obtain and hone these skills for the ultimate purpose of increasing its communities' bushfire preparedness.

The Country Fire Service (CFS) of South Australia (SA) has a dedicated community education unit which is currently facilitating several community engagement initiatives. These include Bushfire Blitz meetings (informative and interactive 45 minute community presentations focusing on bushfire risk in the area, bushfire behaviour, how to protect house and property, and personal survival and planning); Bushfire Ready meetings (longer 90 minute presentations offered to the general public, providing information about bushfire risk, behaviour and

preparedness); a Community Fire Safe program (designed to assist residents living in at-risk bushfire areas by forming community action groups, much like Community Fireguard); and Fiery Women (two day practical and theory workshops providing women with a non-threatening setting to learn about bushfires and how to prepare for them) (South Australian Country Fire Service, 2011).

The Model and principles of community engagement adopted by South Australia's CFS, which includes the continual development of new initiatives (through the consultation and piloting of programs within the community), thus provides a very good example of how an agency can move from the futile traditional information dissemination method of promoting bushfire preparedness, to the much more difficult but much more effective, community engagement approach.

As this study's participants were recruited from Tasmanian communities deemed at risk from bushfire, the past and present community education programs that they have been exposed to or are currently offered to them (by the Tasmania Fire Service) is important information that will provide a context for their existing level of awareness and bushfire preparedness adoption. The following section provides a brief summary of the Tasmania Fire Service's approach to community education in the last 10 years.

3.3.3 The Tasmania Fire Service's past and present community bushfire education strategies

According to the Tasmania Fire Service website, no community engagement program is currently available, however the Community Education Unit do run a school-based house fire education program and Project WakeUP, which aims to raise

awareness of house fires and changing smoke alarms bi-annually (Tasmania Fire Service, 2011).

At the commencement of the present research in February 2009, the Tasmania Fire Service (TFS) community bushfire education campaign, *Bushfire: Prepare to Survive*, had been in effect for three years (2006 – 2008). This campaign, including a suite of education material consisting of booklets, pamphlets, checklists, and a DVD was deemed successful in increasing the awareness of bushfire risk in Tasmania (Enterprise Marketing and Research Services, 2010). However, whether this awareness campaign had any effect on residents' level of bushfire preparedness was not able to be determined (Enterprise Marketing and Research Services, 2010). In 2009, and in response to the growing recognition that information dissemination does not automatically result in increased adoption of preparedness measures, the TFS introduced the Bushfire Ready Communities Tasmania Pilot (Pilot). This represented a new direction and approach for the agency and thus provided a unique opportunity to study how a fire agency tries to adapts to and shift towards a community engagement approach to community education.

Initiatives that actively involve residents in bushfire mitigation have received very little attention by researchers (for exceptions see Gilbert & Marsh, 2009; Jakes, Kruger, et al., 2007; McGee, 2011). Therefore, the action research component of the present study (presented in Chapter 8) allowed data to be collected prior to, at the commencement of, and during the trial of a community engagement program. This was achieved by the subsequent collaboration of a University of Tasmania (UTas) researcher (the PhD candidate) and the Tasmania Fire Service Community Development Officer.

However, this Pilot was not the TFS's first attempt at promoting community bushfire preparedness through a community engagement approach. The following section provides a brief history of the TFS's Community Fireguard program that ran from 2000 to the end of 2002. The section concludes with a discussion of why this community engagement program was ended and a caveat for the development of future engagement programs.

3.3.3.1 The Tasmania Fire Service Community Fireguard Program

In 2000 the Tasmania Fire Service (TFS) adopted a model of ongoing group fire safety programs that was first pioneered by the Country Fire Authority (CFA) in Victoria (see section 3.3.2). Community Fireguard (as introduced above) was based on the concept of identifying residents living in high-risk bushfire locations, facilitating the formation and development of groups of neighbours, providing them with the knowledge and information to adequately prepare for bushfires, and achieving an ongoing level of planning and preparedness for bushfires (Gilbert & Marsh, 2009). The process through which a Community Fireguard group was established followed a pattern. A TFS Fireguard facilitator invited neighbours living in high risk areas to form a group. After a group was formed, the residents met at one of their homes where the trained facilitator guided them through as series of modules which increased their knowledge and understanding of bushfire risk in the local area, bushfire behaviour, and what they could do to become better prepared. Following the completion of the core modules (usually four consecutive evening sessions) the facilitator adopted a support role to the group (upon request would supply more information, e.g., provision of brochures etc.), largely leaving the Fireguard groups self-managed. In this model, a successful Fireguard group would be one that

remained active by making plans and preparing together, and meeting up prior to the commencement of the bushfire season.

During the three years it was actively promoted and supported by the TFS, more than 80 fireguard groups were formed around the state and included more than 1000 members. From 2003 the TFS ceased to actively promote and support the Community Fireguard program. Although no formal explanation is available for why the TFS discontinued with Fireguard, reasons given anecdotally include lack of evaluation proving its effectiveness, high cost, and difficulty of engagement approach (e.g., high time demands on facilitators).

Moreover, examination of the program design suggests that quality or sustainability of these Fireguard groups was not as important as the quantity of the groups formed. For example, of the nine performance criteria detailed in the Fireguard Facilitators job description the first three read; 'total number of groups established'; 'new groups established'; and 'number of meetings'. Only in the seventh criteria is any reference to quality of these groups mentioned; criteria seven reads; 'high achievement of self-reliant groups'. Based on these criteria it is unsurprising that a monetary incentive was provided to facilitators for the quantity, not quality, of groups established. Therefore, it may be that Community Fireguard, as a community engagement program, was terminated by the TFS due not to a fault in the program concept (i.e., community engagement approach), but in the way it was designed and facilitated; from a top-down, quantity over quality driven approach.

It could therefore be suggested that one of the reasons people living in areas at risk of bushfire continue to demonstrate low levels of preparedness adoption is that the education campaigns tasked with promoting this fail to realise their potential not because the information is inappropriate but because inadequate attention is paid to the context in which information is disseminated and received.

Although Community Fireguard is no longer officially supported by the TFS, many groups remain active, including in some of the present study's target communities. As such, how these groups were started, the extent of past and present support from the fire service, where these groups continue to exist, in what capacity they exist/existed (degree of activity), and what benefits residents felt membership provided, were pertinent research questions for the present study. Such information would be invaluable in informing the development of a more effective community bushfire education program; the second principal aim of the present study.

As Chapter Eight will discuss, the action research component of the thesis, which dovetailed with the development and administration of the Tasmania Fire Service Bushfire Ready Communities Tasmania Pilot (Pilot), provided an opportunity to explore, from the start, the implications of an agency adopting a new approach to the community elements of risk communication, how community knowledge and processes changed, and how relationships between agencies and communities influenced the process. It thus provided an opportunity to examine changes in, for example, risk perception, preparedness and empowerment from the point of commencement of a new risk management program. .

In concluding the introduction of this thesis, a summary of the two principle aims of the present study are once again provided. The aims of the present research were to determine:

- How, in what ways, and to what extent do individual, community and social processes interact to influence how people develop and enact risk beliefs and preparedness actions?
- How can identified social and cognitive factors and processes, demonstrated to effect individuals' decisions to adopt bushfire preparedness measures, be utilised to develop more effective bushfire education programs?

The purpose of the present study was thus to propose, test, and validate a new model of preparedness, namely the Social Attachment Model of Bushfire Preparedness. The suggested fundamental antecedent role of place attachment in the bushfire preparedness decision making process provides a novel contribution to hazards research. In another first, the identified social and cognitive factors, demonstrated by the Social Attachment Model of Bushfire Preparedness, were practically applied through action research to inform the development and application of more effective community bushfire preparedness program based on the principles of community engagement.

Before this thesis turns to presenting the results of the current research, an overview of the methods employed in this mixed-methods action research study is offered.

Chapter Four – General Methodology

4.1 Introduction

This study was an action research project which utilised a mixed-methods approach to test, validate, and practically apply a model of bushfire preparedness to a fire agency community bushfire preparedness initiative. As such, the study comprises three distinct but interrelated components. The first component of the study involves the testing of the theoretical Social Attachment Model of Bushfire Preparedness using quantitative data obtained from a postal survey of Tasmanian residents. The quantitative assessment of the Model using structural equation modeling will test the degree to which the variables introduced in the Social Attachment Model interact as hypothesised to influence people's decision to either prepare or not prepare for bushfires. As theoretical models include generic variables of behaviour, and thus do not account for individual community differences, comparisons (obtained through analysis of variance) were conducted to determine what community and individual demographic differences might also contribute to influencing people's decisions to prepare for bushfire.

The second component of the study utilises a qualitative, action research approach using data from telephone interviews conducted with residents living in communities identified by the fire agency as facing comparable levels of physical risk from bushfires. These data will be used to both validate the Social Attachment Model of Bushfire Preparedness and to provide a foundation for the longitudinal evaluation of a community engagement-based risk communication program (see below) and for providing a deeper understanding of the factors and relationship processes that influence people's decisions to prepare for bushfire. The rationale for

conducting telephone interviews and using thematic analysis will be discussed in more detail below.

The third and final component of the study involves the application of the findings of the Social Attachment Model of Bushfire Preparedness analysis to the development and administration of a pilot community engagement program initiated by the Tasmania Fire Service. The role of the researcher was to collect data from residents participating in the Pilot project as well as the volunteer fire brigades in whose area the Pilot was being conducted. These data was then used not only to evaluate the Pilot project but to be fed back throughout the course of the Pilot so that the Community Development Officer could continue to improve and adjust the Pilot to suit the communities. The collaboration allowed the researcher input into the development and implementation of Pilot project initiatives; however, the researcher at no point facilitated any of the activities, but rather collected data, in the form of surveys and interviews, from participants. This collaboration will be discussed in more detail below.

As such, a mixed-method approach, consisting of postal surveys, semi-structured interviews, field surveys, focus groups, and feedback forms, was employed to integrate the quantitative and qualitative methods and data so to allow the components to be mutually illuminated throughout the research process (Johnson & Onwuegbuzie, 2004; Bryman, 2006; 2007).

The next section provides an overview of the action research approach, and mixed-methodologies that form the basis of data collection, analysis, and interpretation for the thesis. Further detail and explanation of methodologies used are provided in the relevant chapters.

4.2 Action Research

An important goal of applied research is to have it used in the 'real world'. The research presented here was supported by the Bushfire Cooperative Research Centre (Bushfire CRC).The principles that underpin research supported by the Bushfire CRC is that it be theoretically rigorous and that it can meet a recognised agency need. In this case the agency needs related to bushfire preparedness and the need for a better understanding of how community engagement can be used to facilitate sustained preparedness.

Although the social sciences continually produces findings and increases knowledge through the conduct of rigorous research, it is by no means a given that this information will be fed back and used (Hult & Lennung, 1980). Furthermore, it could also be argued that research should be conducted first and foremost where problems exist and improvement is necessary. Action research, with its wide range of application in classrooms, hospitals, and community contexts, provides a viable and practical approach for conducting social studies that require systematic, organised, and reflective investigations (Reason & Bradbury, 2001). Furthermore, "an action research project emerges from and has to contribute to the solution of existing practical problems. It never emanates from theory alone" (Hult & Lennung, 1980, p. 242). Action research describes an approach that venerates principles of participation, reflections, and empowerment of people and groups interested in improving their social situation (Berg, 2007). This is achieved through collaboration with the participants and the cyclical process of identifying research questions, gathering information, analysis and interpretation, and sharing these results with the participants. From this description it becomes evident why this approach was chosen to fulfil the present studies research aims.

As such, the aim of action research is to contribute to and expand existing knowledge that will be useful to people in the conduct of their everyday lives, and secondly, that this knowledge will act to enlighten and empower these people to use the information obtained in the research to improve their situation and ultimately increase their wellbeing (Berg, 2007; Hult & Lennung, 1980; Reason & Bradbury, 2001).

This action research, conducted through the collaboration of the researcher, the Community Development Officer from the Tasmania Fire Service, and the target communities, thus also acted and allowed the applied component of this study, a community development pilot project based on the theory and data derived from the present research, to be evaluated. This was achieved through utilising a mixed-methods approach, triangulating qualitative and quantitative data from postal surveys, telephone interviews, focus groups, field surveys, and feedback forms.

4.3 Mixed-Method Approach

A mixed-methods research approach combines both quantitative and qualitative research techniques, methods, and concepts in a single study. As such, it overcomes the difficulty of choosing between qualitative and quantitative paradigms and rather provides a complementary alternative which offers a pragmatic approach to answering the complex questions asked by the social sciences. As a result, some researchers have even referred to it as a "third methodological movement" (Tashakkori & Teddlie, 2003, p. ix).

The benefit of a mixed-methods approach is its ability to utilise the strengths of both the qualitative (explorative, constructivist, inductive, hypothesis/theory generation) and quantitative methods (deductive, hypothesis/theory testing,

predictive). Therefore, it satisfies the need for both a comprehensive understanding of social interaction, processes, and issues, as well as the scientific method obligation that these explorations should be backed by testable and replicable data and findings. The real strength of mixed-methods research then, is its emphasis on diversity and integration of data and analysis, which in this study was achieved through the triangulation of data, methods, and results.

The term 'triangulation' borrows from the land surveying and navigation disciplines and refers to the method of determining a specific point through the measurement of two or more known points or locations. As such, in the field of social sciences and mixed-methodology, Denzin (1978, p. 304) described triangulation as involving "a complex process of playing each method off against the other so as to maximise the validity of field efforts". After much debate in the literature, a much broader definition of triangulation has been adopted and describes "triangulation as a strategy leading to a deeper understanding of the issue under investigation, and thereby as a step on the road to greater knowledge, and less towards validity and objectivity of interpretation" (Flick, 2002, p. 179). As such, triangulation is not solely used in the traditional sense of a validation tool, and is more frequently being used as a strategy for justifying and reinforcing knowledge by supplying additional information. In this study, a 'between-method triangulation' approach is adopted (Flick) whereby data from a combination of qualitative and quantitative data collection methods (including postal surveys, telephone interviews, feedback forms, focus groups), will be triangulated to validate the Social Attachment Model of Bushfire Preparedness as well as provide a deeper and richer understanding of what motivates people to prepare, or not to prepare, for bushfires.

A main criticism of the mixed-methods approach and triangulation is the tendency to just pitch methods together to gain a 'total' picture of some phenomenon (Flick, 2002). Silverman (2005, p. 122) warns that "this 'whole picture' is an illusion which speedily leads to scrappy research based on under-analysed data and an imprecise or theoretically indigestible research problem". At the risk of combining different methods with little attention paid to their respective theoretical backgrounds, Fielding and Fielding (1986) argue that theories and methods should be combined carefully and purposefully with the aim of adding breadth and/or depth to the analysis. As such, the following section provides detail of the rationale and application of the qualitative and quantitative methods conducted in this mixed-methods design and action research application.

4.3.1 Quantitative methods

4.3.1.1 Structural equation modeling

To test the theoretical Social Attachment Model of Bushfire Preparedness, structural equation modeling (SEM) was utilised to determine how individual and social factors interact to account for differences in levels of bushfire preparedness. Structural equation modeling was the statistical method of analysis chosen due to its ability to calculate multiple and inter-related dependence relationships simultaneously. This allows for the Model to be tested as a whole so to thus determine how well the data fit the theoretical model (Byrne, 2001). Full detail of the SEM procedure and justification of its use are provided in Chapter Six.

4.3.1.2 Analysis of variance

Between-group differences in preparedness adoption and social variables measured across the four areas were analysed by conducting a series of univariate

analysis of variance (ANOVAs). The study was interested in determining whether the four target communities differed in their level of preparedness, and if so, could this be explained by significant differences in individual and social variables represented in each community. The use of between-groups analyses is supported by the supposition that communities, due to their diversity (e.g., socio-economic, cultural, urban/rural), would also vary significantly on the social and cognitive factors identified in the Model and thus be promoted to prepare through the influence of a unique combination of variables. Confirmation of significant differences between communities would support the community engagement principle of treating each community as unique and subsequently addressing their needs and capacities on a case by case basis. Full detail of the analyses is provided in Chapter Six.

4.3.2 Qualitative methods

To validate and further explore the variables portrayed in the Social Attachment Model of Bushfire Preparedness, qualitative data were collected through conducting in-depth semi-structured telephone interviews with a sample of residents living in the four target Tasmanian communities.

4.3.2.1 Using narratives to assess people's perceptions of, beliefs about, engagement with the social environment

Interviews were chosen as a method of collecting data because the present study was interested in the individuals' perceptions of why they did or did not prepare for bushfires, and what factors influenced these decisions. Telephone interviews (see below) were conducted.

Understanding residents' own perceptions of the reason for their behaviour is fundamental. It would be futile to base community education programs on others' (e.g., experts, fire agencies) perspective of how residents think, as they would not address the interpretive processes that influence residents' decision making. Furthermore, unless risk communication and education programs are based on the way residents' reason with this information, agencies cannot expect positive behaviour change to emanate from the residents themselves.

Moreover, different people have different reasons for doing something, so observational data would not have been able to explain why people had decided to do something. In light of this position, the present study treated interviews with residents as narratives that describe their world, rather than 'true' pictures of 'reality'. Due to this study's proposition that individuals do not themselves always know why they act in the way they do, and that their behaviour is influenced by their social environment, interview responses were not be treated as providing direct access to 'experience' but rather as actively constructed 'narratives' involving activities which themselves demand analysis (Silverman, 2005). As a result, mere content analysis of the interview data would not suffice, and further analysis uncovering the reasons and processes leading to people's attitudes and behaviour were conducted (see section 4.3.2.5).

4.3.2.2 Justification for conducting telephone interviews

Because of the geographical spread of target communities and the need to conduct all interviews within a finite period of time, telephone interviews were undertaken. This method was most appropriate for interviewing people who were widely dispersed within a time frame that ensured comparability. Telephone interviews were selected as the main method of obtaining qualitative data since they

are more economical than face-to-face interviews (e.g., less travel time, less time organising meetings, and can sample a wider demographic), and less obtrusive. Furthermore, telephone interviews are deemed an effective method of interviewing when the researcher has specific questions in mind (interview schedule) and when the researcher has already had face-to-face meetings with or built a rapport with interview participants during previous fieldwork (e.g., meet face-to-face during recruitment) (Berg, 2007).

Telephone interview participants for this study were recruited from bushfire information sessions held in their local communities where the researcher had invited all attendees to participate in the present research. As such, when community members approached the researcher at the conclusion of the event, the face-to-face encounter allowed the researcher to establish the legitimacy and implication of the research, and the potential participant's role in the study. In many of these encounters, lengthy discussions about bushfire and non-bushfire issues were discussed, and thus prior to the interview, a rapport had been established. Arguably, this rapport played a large part in the lack of attrition from phase one interviews (n = 34), and phase two interviews conducted 12 months later (n = 34).

4.3.2.3 Interview schedule

The interview schedule was based on the schedule developed by Paton, Kelly, et al. (2006) and also used by Paton, Bürgelt, et al. (2008). The interview schedule was presented to participants in a 'semi-structured' interview format (see Appendix D). One of the benefits of semi-structured interviews is that the researcher has the freedom (and encouraged) to digress, to probe beyond the answers to their prepared questions (Berg, 2007). Similarly, they are permitted to adjust the language to suit the audience or particular interviewee. The benefit of this freedom is that the

interviewer, by adjusting the language of the question will ensure that the participant understands the question and thus provides the most accurate data. On the other hand, if the researcher asks questions that the participant does not understand, or uses a vocabulary unfamiliar to the participant, they may form negative attitudes towards the researcher and their involvement in the study, and thus not provide as much information or even terminate the conversation. Therefore, the added benefit of adapting the language of the question to suit the audience is the development of trust between the interviewer and interviewee, and a feeling of the participant that the researcher empathises with their situation. For example, intimate knowledge of the community or area the participant was from, and the issues they were likely to be passionate about, aided in the establishment of trust and increased the likelihood and their desire to divulge further information than that elicited by the prepared questions. Even something as seemingly basic as adopting the nicknames communities had ascribed to the certain groups, such as ‘firies’ for fire department people, ‘volunteers’ for volunteer fire brigade members, ‘shackies’ (shack owners), or ‘greenies’ (individuals perceived to be passionate about environmental issues), aided the establishment of a common language, and as a result the build of rapport. Unscheduled probes are another way for the researcher to understand the world and the issue at hand from the participant’s perspective.

4.3.2.4 Interview procedure

Telephone interviews were scheduled to be conducted before and at the start of the official bushfire season, between October and December (the bushfire season is deemed to be between November and March by the Tasmania Fire Service). This timing was selected so to engage with residents during the time that they should be thinking about bushfires and, if not already adopted, implementing bushfire

preparedness behaviours (Note: the researcher recognises that the telephone interviews may have acted as prompts to adopting such behaviour which may have biased results; however, the researcher does not consider residents becoming more prepared as a result of participating in the present study as a negative result). As such, their ability to express the decision making process they were engaging in regarding the adoption of bushfire preparedness behaviours should be easier and more accurate at the time they were actually making the decision, as opposed to providing retrospective answers following the bushfire season. As classical memory theory explains, people's ability to recall the reasons for making a decision, and most past episodic detail for that matter, is poor and inaccurate (see for example Loftus & Pickerel, 1995; Neisser & Harsch, 1992).

Prospective interviewees were contacted at the time specified by them on their consent form (day of the week, time, and sometimes specific dates). The interviewer introduced herself again and the reason for calling, and asked whether the resident was still interested in participating. If the resident indicated that they were still interested in participating but that it was not a convenient time, arrangement for a future interview were made.

All interviews were conducted over the telephone and consent was again obtained for recording the interview. Participants were again assured that they would remain anonymous in the process, and that any individuals that they might refer to/identify (e.g., neighbour, brigade chief) in their interview would also be given synonyms to ensure their anonymity. All interviewees agreed to have their interviews recorded. A telephone line adaptor (JNC Digital) was used to record the interviews to an 80 gigabyte iPod (Apple Inc.) with an attached MicroMemo (XtremeMac) voice recorder. As well as being stored on the hard drive of the iPod

for transcription purposes, interview files were also downloaded and stored on a personal computer.

4.3.2.5 Interview transcription and analysis

Interviews were transcribed verbatim into a Microsoft Word document. These documents were then transferred into the Computer Assisted Qualitative Data Analysis Software NVivo 9 (QSR International) for analysis. Thematic analysis was selected as the method of analysis for these data.

Thematic analysis is a widely used method of conducting qualitative analysis (Braun & Clarke, 2006). Thematic analysis is the exploration across a data set, be it interviews, focus groups, and/or texts, to find repeated patterns of meaning (Braun & Clarke). Braun and Clarke (2006) propose that thematic analysis is in fact what researchers carry out unknowingly when attempting more supposedly sophisticated or highly-regarded forms of analysis like grounded theory, but lack the required knowledge or skills to do so. In fact there seems to be a growing trend of researchers ascribing to a 'light' version of grounded theory, whereby they adopt the coding procedures but not the theoretical commitments. The authors argue that this is actually a very close lookalike to thematic analysis. Since qualitative data in the present study is not used to develop theory, but is rather employed to validate and further describe a theoretical model of bushfire preparedness, thematic analysis rather than grounded theory was selected as the analysis of choice.

Thematic analysis has on occasion been described as a research tool (e.g., Boyatzis, 1998) or a process performed within other 'major' analytical traditions (e.g., Ryan & Bernard, 2000), like grounded theory, rather than a specific approach in its own right. Braun and Clarke (2006) however, argue that it should be

considered a qualitative analysis method in its own right and advocate its flexibility as well as a relatively straightforward six-phase guide to performing thematic analysis (Table 4)

Table 4

Phases of Thematic Analysis (adapted from Braun & Clarke, 2006)

Phase	Description of the process
1. Becoming familiar with the data	Transcribing data, reading and re-reading the data, noting down initial ideas.
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

This six-phase guide was used to conduct thematic analysis on the qualitative data obtained from telephone interviews with residents living in bushfire risk communities.

As thematic analysis adopts coding techniques often used in grounded theory methodology, a more detailed description of phases 1 to 5 (see Table 4) and the coding techniques commonly used is now provided.

(Phase 1) Although transcribing interviews is very time consuming, it provides an excellent way for the researcher to build knowledge of their data and is thus even argued to be a "key phase of data analysis within the interpretive methodology" (Bird, 2005, p. 227). Full transcripts conducted by the researcher who will be analysing the data ensures that seemingly irrelevant expressions and wordings, such as 'umms', repeated words, pauses, laughter et cetera, are not edited out (Bazeley, 2007). In a similar vein, incomplete sentences or breaks in conversation can provide a deeper understanding of the participant's belief and context. As such, all interviews conducted were transcribed verbatim by the researcher herself.

(Phase 2) Guidelines for conducting 'initial coding' include remaining open to exploring the data and unassuming by not applying pre-existing categories to the data. This way, coding will be as close to the data as possible. Codes represent the most basic segment or element of the raw data without losing context or meaning (Braun & Clarke, 2006). As such, codes should be simple and precise, and are best reflected as action so to avoid making conceptual leaps or adopting theories before analysis is complete. Where possible, *in vivo* codes, codes whose description includes words or phrases that the participants themselves used, helps preserve participants' exact meaning and avoids removal of context (Charmaz, 2006). In this initial phase of coding, speed and spontaneity, as well as constant comparison of data to data ensure that the initial codes remain close to the data.

(Phase 3) Once all the data have been coded and collated the researcher goes through and sorts the codes into clusters, or potential themes, of similar ideas or phenomena. The result from this initial analysis is that all the codes will be collated under initial themes. Codes that do not seem to fit 'neatly' under other themes are collated under a 'miscellaneous' theme to be revisited later. This phase concludes with a collection of candidate themes, sub-themes and the extracts of text that have been coded and relate to them. These initial themes are then further refined in the next part of the analysis (Braun & Clarke, 2006). In this way, this third phase is similar to 'axial coding' employed in grounded theory which involves sorting, synthesising, and organising the fractured text segmented into codes during the initial coding phase into new categories and subcategories (Charmaz, 2006).

(Phase 4) Finally, once a set of candidate themes have been devised from phase three, refinement and scrutiny of each potential theme takes place. For example, the researcher may find that some 'themes' are not in fact themes (e.g., only one code represents it), and therefore can be collapsed into other themes or be broken down into further sub-themes. Themes should be clearly distinct from each other and the data within them cohere together meaningfully. Two techniques of refinement complete this phase. Firstly, the researcher should read all the codes that have been selected to represent the relevant themes. The researcher may find that some codes better represent other themes, represent new themes, or need to be discarded from the analysis altogether. Once the researcher is satisfied that themes developed best represent the data, and codes are allocated suitably, the researcher analyses the validity of each theme in relation to the overall data set. At this point the researcher should also revisit the data set and code any additional data within the themes that was missed during the initial coding phase (Braun & Clarke, 2006). This

phase therefore reflects the ‘focused coding’ stage adopted by grounded theory analysis (Charmaz, 2006).

Thematic analysis, utilising the rigid coding techniques also employed by grounded theory, was applied within a mixed-method action research methodology. In this way, the proposed Social Attachment Model of Bushfire Preparedness could be tested, through the use of structural equation modeling, on a sample of Tasmanian residents living in communities at risk of bushfire, and thematic analysis of the interview data obtained from a sub-sample of these residents, used to validate the appropriateness of this Model. The following chapter thus provides a summary of the rationale, construction, and distribution of the Bushfire Preparedness Questionnaire distributed to the sample areas.

Chapter Five – Assessing Bushfire Preparedness

5.1 Introduction

As outlined in Chapter Four, this study adopts a mixed-methods approach to firstly explore what motivates people to adopt preparedness and secondly, to determine how these characteristics can be applied to develop an effective community engagement program (Chapter 9). This chapter thus presents the first step of data collection for the study which involved the development and distribution of the Bushfire Preparedness Questionnaire to a sample of Tasmanian communities identified as being at risk to bushfires.

This chapter will begin by detailing the communities that were targeted by this study. A detailed summary of the Bushfire Preparedness Questionnaire and included measures will then be presented followed by the results of the factor reduction analysis applied to the measures to ensure validity. The descriptive results of the sample then follow. The chapter concludes with a discussion of these findings and efficacy of subjecting these data to structural equation modeling analysis.

5.2 Methods

5.2.1 Participants

Questionnaires were distributed between the 15th and 29th of January, 2010. The timing was selected to coincide with when residents would recognise the bushfire season had commenced and that they should have adopted preparedness measures. At this time, no fires had occurred in or near the target areas. The target areas were chosen following consultation with the Tasmania Fire Service and were based on a set of criteria including bushfire risk, past bushfire activity, proximity to city centre,

and other demographic characteristics. These criteria were chosen to maximise variability between target areas, except for the critical common variable of being a bushfire risk area. Four target areas were selected; Bagdad, Binalong Bay, Fern Tree and Snug (Figure 3). Questionnaires were also distributed to Middleton, Kettering and Woodbridge (Figure 3) as these communities neighboured two of the original communities where designated questionnaire distribution was not reached (due to small size of communities). Figure 3 illustrates Tasmania in location to Australia, and shows a map of Tasmania indicating the location of the target areas.

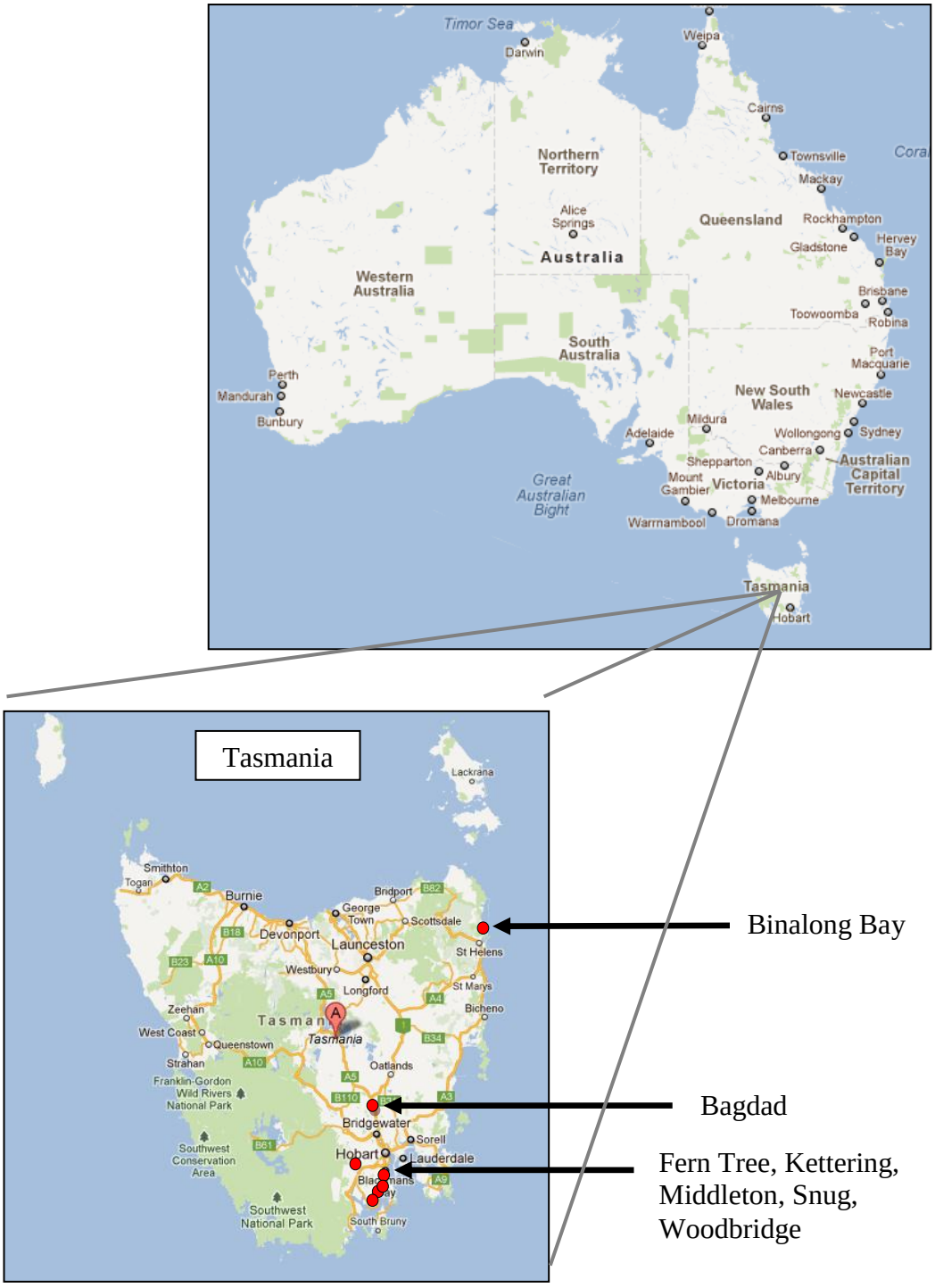

Figure 3. Tasmania relation to Australia, and location of target communities (Tele Atlas, 2012).

Table 5 shows the number of questionnaires distributed to each target area, the number returned, area population, and return rate.

Table 5

Number of Questionnaires Delivered to Target Areas, Return Rate, and Percentage of Population Sampled

Target Area	Surveys Delivered	Surveys Returned	Return Rate %	Pop'n Town	% Delivered/ Population	% Returned/ Population
Bagdad	200	26	13.00	739	27.06	3.52
Binalong Bay	221	38	17.19	204	108.30	18.63
Fern Tree	250	60	24.00	598	41.81	10.03
Kettering	30	10	33.33	392	7.65	2.55
Middleton	80	9	11.25	499	16.03	1.80
Snug	196	26	13.27	881	22.25	2.95
Woodbridge	25	9	36.00	271	9.23	3.32
Other	_	3				
Missing data	_	7				
Total	1002	188	18.76			

(Population data sourced from: ABS, 2011; *Surveys also delivered to nearby area, the Gardens, which is not included in the ABS population data)

Four hundred and forty three questionnaires were hand-delivered collectively to letter boxes in the communities of Fern Tree, Middleton, Binalong Bay, and Snug. In some of the target communities (e.g., Middleton, Binalong Bay, Snug, Kettering, Woodbridge, and Bagdad), residents had post office boxes instead of letter boxes. Therefore, post offices were approached and asked if they would randomly distribute the questionnaires to the post office boxes. Only one of six post offices approached declined. Therefore, a further 466 questionnaires were randomly distributed to post office boxes by the post office staff. A further 93 questionnaires were sent to a

council community liaison officer who randomly sent questionnaires) to Binalong Bay residents who did not have letter boxes and where post office distribution was not available (post office declined to distribute questionnaires).

As questionnaires were distributed to seven target areas, due to many of the questionnaires being distributed by the local post offices, more communities than were initially targeted were sampled. Therefore, eight general localities made up the sample of the Bushfire Preparedness Questionnaire for the 2009/10 bushfire season. These included the area around Binalong Bay (including St Helens and Bay of Fires), Bagdad (including Dysart), Fern Tree (including Ridgeway and South Hobart), Snug (including the Channel, Coningham, Margate, Electrona), Kettering (including Oyster Cove), Woodbridge (including Birchs Bay), Middleton (including Flower Pot and Gordon), and an 'Other' category (including Winkleigh, Kingston, and Trial Bay). This category included localities that did not fit into the other eight localities (due to their distal outlying proximity). These areas were most likely included because the participant owned a holiday home in one of the areas targeted.

In total, 1002 questionnaires were distributed and 189 returned, giving a return rate of 18.76 per cent. One questionnaire was discarded due to being drawn on rather than completed. As such, the final sample consisted of 188 cases.

There seems to be no consensus among social researchers as to what is an adequate response rate for mail out surveys, although many suggest that between 10 and 20 per cent is common (e.g., Denscombe, 2007; Neuman, 2000). The fact that the Questionnaires were delivered to letter boxes, and thus no record of delivery addresses kept, it hindered the ability for common follow up methods to be utilised

(e.g., postcard, letter reminders etc.). However, posters were put up in the target areas (e.g., local hall, shop, post office) to promote return rate.

5.2.2 Materials

The Bushfire Preparedness Questionnaire was used for this study. This survey was adapted from Paton, Bürgelt, and Prior's (2008) previous research on bushfire preparedness in Tasmania and New South Wales (Australia). The questionnaire consisted of 18 measures as well as questions eliciting demographic information (see Appendix A).

In the initial stages of data analysis (i.e., correlational matrices) many of these measures were found not to make any significant contribution to the Social Attachment Model of Bushfire Preparedness. Subsequently, only those measures that made a meaningful contribution to the Model will be described. They include Positive Outcome Expectancy, Negative Outcome Expectancy, Place Attachment, Sense of Community, Community Involvement, Empowerment, Trust, Responsibility, Intention to Prepare, and actual Bushfire Preparedness. Description of these questionnaire items and measures follows. Section 5.3.4 later provides a summary of the item reliability (Cronbach's alpha) of each measure (Table 6).

5.2.2.1 Personal information (Q1)

The first batch of items was asked to elicit some personal and demographic information from respondents. Questions included respondents' location, gender, age, highest level of education achieved, relationship status, children (and youngest age) living at home, occupation, residency status (own/rent, permanent/part time, length of residency), whether they had built their home, and length of time lived in area. Although demographic variables are somewhat redundant in terms of their

ability to be manipulated to foster preparedness change (i.e., community involvement could be increased to promote empowerment, but a resident's gender or age cannot be manipulated), such information can be used to uncover profiles of people who are more, or less, likely to prepare, thus allowing for community education programs to be more specifically tailored, and thus more effective.

Age of children. Participants were asked to indicate whether they had any children living at home with them. If they ticked 'yes' they were asked to tick the box indicating the age of their child/children. In many cases, more than one age group box was ticked indicating that the participant had more than one child. Therefore, in the final data set used for analysis, only the youngest age group indicated by the participant was entered. This decision was made based on initial anecdotal evidence from telephone interviews indicating that families with young children were more likely to leave early than to stay and defend because they determined this to be the safest option.

5.2.2.2 Bushfire preparedness (Q2)

To determine if resident actually believed there to be a bushfire risk in their community (and so to frame their responses the following questions about intention and action preparedness measures adopted), respondents were asked to indicate 'yes' or 'no' and provide a comment to the question 'do you believe there is a bushfire risk in your area?'

Actual bushfire preparedness. In previous studies of disaster preparedness (e.g., earthquakes, volcanic eruptions, tsunami, and bushfires), the outcome variable of preparedness has been measured by either a checklist of possible preparedness actions, or, where frequency or familiarity of the hazard is low (e.g., tsunami in

Tasmania; Paton et al., 2010), a measure of intention to prepare was used instead. Intention to prepare has been shown to be a strong predictor of actual preparedness (Lindell & Perry, 2000; Paton et al., 2009; Paton, Kelly, et al., 2006; Paton et al., 2005).

The present study asked participants to indicate with a 'yes' or 'no' if they had undertaken any structural changes to their house to account for bushfire threat, whether they had any bushfire fighting equipment, and whether they had any bushfire protective clothing (see Appendix A for Bushfire Preparedness Questionnaire). If they answered yes to any of the aforementioned, they were asked to describe/list the preparedness action/s they had taken. These details were then subjected to further grading.

The answers listed to the question asking participants to comment on the structural changes they had made to accommodate bushfire risk were rated from 0 to 3. A score of 0 was given if they had not made any structural changes, 1 if they listed something that was not bushfire specific (e.g., landscaped garden), 2 if they had listed 2 or less specific changes (e.g., Gutterguard, extra tank, no wooden decks), or 3 if they had listed 3 or more bushfire specific structural changes.

The question asking participants to list the bushfire equipment they had (if any) was rated from 0 to 3. A score of 0 was given if they did not have any bushfire fighting equipment, 1 if they listed less than four items of nonspecific fire fighting equipment (e.g., hoses, mops, rakes), 3 if they listed four or more items of nonspecific bushfire fighting equipment, and 3 if they listed specific bushfire fighting equipment (e.g., fire fighting pump, extra water tank for fire fighting purposes, fire fighting hoses, roof sprinklers). The question asking participants to list

their bushfire protective clothing was rated from 0 to 3. A score of 0 was given if they did not have any bushfire protective clothing, 1 if they listed less than four nonspecific items (e.g., woollen or cotton trousers/shirt, heavy boots, goggles, masks, fire blanket, fire extinguisher), 2 if four or more nonspecific items were listed, and 3 if they listed specific bushfire protective clothing (e.g., TFS issued clothing, flame retardant Proban overalls).

Since some people have planned to leave rather than stay and defend in the event of a bushfire, consideration was given to these cases and scored accordingly. For example, if a participant indicated they were going to leave early (answered 'yes' to the question, 'do you intend to leave early?'), they were given a score of 0 to 2 depending on what details they had listed. A score of 0 was given if they had indicated 'no' or 'maybe' to the 'do you intend to leave early question?' or had just indicated 'yes' to leaving early without providing details (due to the fact that leaving early requires considerable preparation), 1 if they indicated where they were going to go, and 2 if they also included measures they had taken (e.g., made copies of all important documents, had provisions ready to take). This score was added to the score obtained for the other three preparedness questions to obtain a total preparedness score. Scores ranged from 0 to 15.

Intention to prepare. Two questions were included in the Bushfire Preparedness Questionnaire (see Appendix A) to measure whether participants intended to prepare for bushfires. These questions asked whether residents intended to become more prepared in the next month, and/or intended to become more prepared in the next 12 months. If they answered 'yes', they were asked to comment on how they intended to become more prepared. As the answers ranged from cleaning gutters to installing a bunker, thus representing great diversity, a scoring

system was developed to rate the 'effort' required to implement the listed intentions. Therefore, a score of 0 was given if the participant indicated they did not intend to prepare (e.g., ticked 'no'), 1 if they indicated they might prepare (e.g., ticked 'maybe'), and 2 if they indicated 'yes' they intended to become more prepared. Therefore, as there were two intention questions (next month, next 12 months), a total score of 4 could be obtained.

In addition, if the participant listed/describe the actions they intended to take in the next month and/or in the next 12 months, these actions were each given a score from 1 to 3 depending on the specialist equipment/cost required to implement the action. For example, a score of 1 was given to 'clearing forest litter', a 2 given to 'sealing gaps in roof/walls', and 3 to 'purchase pump'. Therefore, the highest score that could be obtained was 15. Some participants however, indicated that they did not intend to become more prepared because they were 'already prepared' or that they were going to engage in 'normal preparedness'. As it would not be appropriate to score these participants as '0' for not intending to become more prepared, because they were already preparing or prepared, a score of 5, 10, or 15 were given to these participants depending on the level of preparedness they had already adopted.

As such, this study's measures of actual preparedness and intention to prepare provide a unique contribution to hazard preparedness research and endeavour to provide a more accurate way of evaluating these two measures. By eliminating the response bias often associated with providing respondents with a list of possible items (Paton, 2007a), rating the measures adopted against those recommended by the fire service, and reducing the bloating of preparedness scores by 'survival measures' adopted (e.g., non-perishable foods, bottled water, battery operated torch – as these items are held by many residents regardless of their

intention to prepare for bushfires or not), it was anticipated that a more accurate account of residents' bushfire preparedness would be obtained.

Respondents were also asked to indicate whether their friends and family members were prepared for bushfire ('yes', 'no', or 'don't know'), as well as provide further comment on their answer. These questions were included based on the assumption that if the people residents associate with and share values and beliefs with prepare, they are similarly more likely to prepare for bushfires and vice versa (Earle, 2004; Lion et al., 2002; Poortinga & Pidgeon, 2004).

The last item in this question batch asked respondents to indicate and provide details of any previous bushfire information event (e.g., bushfire forum, information session, brigade open day) they had attended. This question was included to determine the occurrence and participation in community bushfire information events in the target areas and whether this attendance prompted greater bushfire risk perception and actual bushfire preparedness.

5.2.2.3 Previous bushfire experience (Q3)

Based on anecdotal conversations with people prior to the commencement of the present research, and due to the inconsistency in the hazard literature regarding the influence of previous experience with actual hazards and its effect on preparedness adoption (Anderson-Berry, 2003; for examples of various views see e.g., Donovan, 2010; Martin et al., 2009; McGee, McFarlane, & Varghese, 2009; McIvor, Paton, & Johnston, 2009; Paton, Johnston, Bebbington, Lai, & Houghton, 2001), three questions regarding the respondents', their friends', and their family's level of preparedness were included. Respondents were also asked to provide details of when, where, and whether there was any damage if they and/or family or friends

had experienced bushfire. This variable was not included in the Model (Figure 2) due to previous research suggesting that it acts as both an inhibitor and promoter of hazard preparedness, and thus, at least in terms of model testing, its inability to discriminate between residents' bushfire preparedness decision making process. Exploration of individual and community differences in these measures will, however, be explored in Chapter Seven.

5.2.2.4 Risk perception (Q5)

Risk perception is commonly studied by hazards research and is a concept adopted by policy makers due to the belief that the higher the level of perceived risk the more people will be spurred to adopt mitigation measures (Sjoberg, 1999). Although risk perception's direct influence on preparedness adoption has been questioned (e.g., Ballantyne et al., 2000; Duval & Mulilis, 1999; Gregg et al., 2004; Johnston et al., 2005; Lindell & Perry, 2000; Lindell & Whitney, 2000; McCaffrey, 2004; McFarlane et al., 2011; Paton, Smith, & Johnston, 2000), risk perception is consistently recognised as an important precursor in motivating hazard preparedness (Johnston, Bebbington, Lai, Houghton, & Paton, 1999; Paton et al., 2005; Sjoberg, 2000). Unless an individual perceives they are threatened by a hazard they are unlikely to respond by taking actions that reduce or mitigate that threat (Paton, 2006b). The risk perception measure included in the questionnaire (see Appendix A) of the present study asked respondents to rate their individual perception of risk on a five-point scale, with 5 = strongly agree, and 1 = strongly disagree.

5.2.2.5 Sense of community (Q6)

To help in assessing the social context within which hazard knowledge is formed, an 18-item, 3 subscale measure of sense of community derived from research by Wilkinson (2008) was utilised. According to Wilkinson, sense of

community consists of three key elements; psychological sense of community, attraction, and neighbourliness.

'Psychological sense of community' has been defined as a feeling residents have of belonging and feeling important to each other, and as such, a shared belief that residents' needs will be met by their commitment to each other. This dimension was measured by 11 items. 'Attraction' is defined as the ability of a community or neighbourhood to induce in individuals a desire to continue living there. Consequently, this dimension is closely related to the concept of place attachment. This dimension was measured by four items. The third dimension, 'neighbouring', refers to the actual interaction of residents with their neighbours. As such, it is a measure of the behavioural component of sense of community (e.g., frequency of visiting neighbours, exchanging favours) rather than attitudes, and is linked to the notion of community involvement. The dimension of neighbouring was measured by three items. All items were measured on a five-point Likert scale, with 1 = strongly disagree, and 5 = strongly agree (Refer to Appendix A for Bushfire Preparedness Questionnaire).

This measure was chosen due to its multidimensional account of sense of community (thus fitting with this study's premise of the social environment being a complex and multifaceted realm) and its excellent validity and reliability coefficients (Prezza, Pacilli, Barbaranelli, & Zamporri, 2009; Wilkinson, 2007).

5.2.2.6 Community involvement (Q7)

To further explore the social impact on hazard judgments, respondents' active community involvement was also measured. The measure of community involvement included a list of possible community activities that a resident might be

engaged in including local progress association, local sports club, church group, state emergency service, local volunteer fire brigade, and/or local environmental group. Participants indicated by ticking the appropriate box which activity they were currently involved in or had been involved in, in the last five years. An 'others' option was also available for respondents to list any other community activities/groups they were or had regularly been involved with.

In previous studies (e.g., Peterson et al., 2006) the number of items or activities 'ticked' by participants have simply been tallied and this total score used to indicate their level of community involvement. This however, does not consider the different levels of engagement required of membership for the different activities. For examples, it could be argued that being a member of the local golf club requires less commitment than the local volunteer fire brigade, or similarly, being a committee member of a local progress association more social dedication than the casual membership of a yoga group.

Therefore, each activity listed by participants was rated on three criteria; degree of sociability, degree of pro-community (for the betterment of the community), and degree of problem-solving required by membership. Each activity was given a rating from 0 to 3 depending on how many criteria that activity fit. For example, golf, was given the rating of 1 because it was a social activity but not deemed pro-community, and not requiring any problem-solving skills. Involvement in a Landcare group (a national network of locally based community groups who care for the natural resources of Australia by conducing weed removal, planting new native trees etc; Landcare, 2011) was given a score of 2 as it was considered a social and pro-community activity, but not requiring problem-solving. Being a member of the local volunteer fire brigade or State Emergency Service was given a score of 3 as

membership of these activities was deemed to be social, pro-community, and requiring a degree of problem-solving that related directly to issues of bushfire risk management at the community level.

5.2.2.7 Outcome expectancy (Q12)

Outcome expectancy describes people's beliefs about the efficacy of adopting hazard protective measures to reducing the negative consequences of natural hazards. It describes the cognitive process of weighing up the perceived costs of adopting behaviour against the perceived benefits (Bennett & Murphy, 1997; Schwarzer, 2008). As such, positive outcome expectancy describes the belief that adopting protective measures will reduce the negative consequences associated with natural hazards and add value to one's life (benefit > costs), whereas negative outcome expectancy reflects the belief that hazards are too destructive for personal action to have any effect (cost > benefit) (Duval & Mulilis, 1999; Lindell & Perry, 2000; Paton, 2003, 2008).

Previous natural hazard research has shown that people holding positive outcome expectancies are more likely to adopt protective behaviours, whereas those with negative outcome expectancies are likely to decide not to adopt preparedness measures (Paton, 2003). The inclusion of a measure of outcome expectancy in the questionnaire reflects the importance perceptions of personal control play when examining hazards with potentially disastrous consequences (McClure, Walkey, & Allen, 1999), such as bushfires.

The outcome expectancy measure consisted of ten items derived from work by Paton, Smith, and Johnston (2005) on the formation of behavioural intentions to adopt preventative nutrition strategies. Five items measured respondents' negative

outcome expectancies, or their belief that regardless of the preparedness behaviour they adopted, they would not be able to mitigate the risk of bushfires. Another five items measured participants' belief in the ability of mitigation behaviour to reduce the damage of bushfires to property, and increase their ability to recover following the event. Responses were measured on a five-point Likert scale, with 1 = strongly disagree, and 5 = strongly agree (Refer to Appendix A for Bushfire Preparedness Questionnaire).

5.2.2.8 Empowerment (Q14)

'Empowerment' is a term used to describe residents' capacity to gain control over their lives and confront environmental issues whilst being supported in this endeavour by external sources as opposed to having these sources tell them what to do or having solutions forced upon them (Paton, 2008). In their study of wildfire preparedness in the United States, Jakes et al. (2007, p. 195) suggested that the "ability of local citizens to apply their knowledge and skills to community wildfire preparedness demonstrates the value of the individual to the overall process, and empowers others within the community to become involved." Therefore, by witnessing the effect of their collective ability to enhance wildfire preparedness, respondents felt an overall sense that something could be done to mitigate the hazard, and that this power was held by them as a community. It has also been suggested that if emergency agencies can empower communities (i.e., provide them with appropriate information and resources) then the communities perception of trust in the agencies will increase, increasing the likelihood of people acting on provided risk mitigation information (Paton et al., 2009). A measure of empowerment (Rogers, Chamberlin, Ellison, & Crean, 1997) was used comprising of three

subscales and 19 items in total. The three dimensions; self-esteem, community activism, and optimism, consisted of nine, six, and four items respectively.

5.2.2.9 Personal responsibility (Q17)

Pervading the 2009 Victorian Bushfires Royal Commission's (Commission) (2010, p. 352) Final Report (Report) was the message that bushfire safety was a 'shared responsibility' between the state governments, municipal councils, household members, and the broader community. Furthermore, the Commission implored that each of these groups must accept greater responsibility for bushfire safety in the future and that a majority of these responsibilities must be shared. The Report went on to recommend that bushfire safety campaigns "should bluntly deliver the messages that ultimate responsibility for health and safety lies with individuals, that tragedy can come suddenly, and that bushfire can kill or have lifelong consequence" (VBRC, 2010, p. 355). As such, fire management agencies are to place greater emphasis on promoting the importance of individual responsibility in ensuring the home is prepared.

Hazards research shows that homeowners who perceive themselves as responsible for their preparedness, rather than attributing this role to emergency management agencies, are more likely to adopt preparedness measures (Ballantyne et al., 2000; Johnston et al., 1999; Mulilis & Duval, 1997; Mulilis & Duval, 1995; Paton, Smith, & Johnston, 2000). The measure of responsibility included in the questionnaire aimed to gauge the level of householder responsibility as a predictor of bushfire preparedness. Responsibility was measured by four items and respondents were asked to rate their responsibility on a five-point scale, with 5 = strongly agree, and 1 = strongly disagree.

5.2.2.10 Place attachment (Q18)

Attachment to place, as depicted earlier (see section 3.1), describes the emotional bond between people and place, and has been found to influence decisions to prepare. The measure of place attachment employed in this study was taken from previous studies that have shown good internal consistency (Kyle et al., 2005; Williams & Roggenbuck, 1989; Williams & Vaske, 2003). This measure includes two dimensions; place dependence and place attachment (see section 3.1.1), consisting of six items each and were measured on a five-point Likert scale, with 1 = strongly disagree and 5 = strongly agree.

5.2.2.11 Agency trust (Q 19)

Due to the infrequency of people's experience of most natural hazards, and the uncertainty surrounding their characteristics (e.g., magnitude, duration, distribution, change over time) when they do occur, it could be assumed that most people will not have detailed knowledge about the hazards, the risks, and potential consequences they could experience. This places limits on residents' ability to develop a practical knowledge of what to do in the event of a hazard (due to low frequency of experience), and subsequently on the debate and discussion (critical awareness) surrounding particular hazard events (because they have not lived in areas susceptible to the particular hazard) (Prior & Paton, 2008; Siegrist & Cvetkovich, 2000). Therefore, hazards research suggests that in the absence of experience or familiarity with a hazard, and information about the hazard, residents will become more reliant on emergency service providers for this information (Paton, 2007b).

As such, residents dealing with infrequently occurring natural hazards will evaluate information in terms of their generalised beliefs regarding trust of the

particular agency providing the information. Consequently, trust can play an important role in predicting hazard preparedness by individuals (Paton, 2007b, 2008; Siegrist & Cvetkovich, 2000), particularly when messages about the adoption of protective behaviours are disseminated by civic agencies (Slovic, 1993). This measure of general trust (in civic agencies, community leaders, law and the media) is adapted from Paton (2008). Respondents were asked to rate their trust in agencies on nine items on a five-point scale, with 5 = strongly agree, and 1 = strongly disagree.

5.2.3 Procedure

Ethics approval, sought from the University of Tasmania Human Research Ethics Committee, was obtained prior to the commencement of the study (approval number H10859). The questionnaire, incorporating an information sheet on the first two pages, was printed as an A5, 24-page booklet. A reply paid envelope was also included with the questionnaire booklet and consent was assumed by the return of the completed questionnaire. In January 2010, 1002 questionnaires were delivered to target communities either through letter box drops or the random distribution to post office boxes by Australian Post office personnel. By early March 2010, data from 188 returned questionnaires were entered into two Excel spread sheets before being transferred to the Statistical Package for the Social Sciences (SPSS, version 17.0) for further analysis.

5.3 Results

5.3.1 Data screening

All data from questionnaires were entered into two separate Excel spread sheets and compared to ensure data entry was correct and to check for missing data. Less than 6 per cent (deemed acceptable by Byrne, 2001) of the returned

questionnaires contained ‘missing completely at random’ (MCAR) data points, and were replaced, as suggested by Tabachnick and Fidell (2007), with a mean substitution (the average response across that item). The approach was chosen in preference to an overall mean as a way of keeping reduction of variance to a minimum (Hair, Black, Babin, Anderson, & Tatham, 2006; Tabachnick & Fidell, 2007). The data was then transferred into the Statistical Package for the Social Sciences (SPSS, version 17.0). Certain scale items were negatively worded and were reversed as required before further analysis could take place. This was achieved by using the score reverse feature in SPSS 17.

Prior to conducting univariate analyses the applicable assumptions were tested. Of the seven latent constructs in the Model, empowerment, place attachment, and responsibility were found to be slightly skewed. However, as Field (2005) notes, due to the robustness of the *F* statistic, skewed distributions seem to have little effect on the results of ANOVA. Homogeneity and homoscedasticity were measured by Levene’s test and where significant, the Welch *F* statistic, as recommended (Hair et al., 2006), is reported instead (further described in below relevant sections). Discussion of outliers and reliability of observed variables follows.

5.3.2 Outliers

To determine if there were any univariate outliers in the data set, the P-Plots and Explore function of SPSS were utilised. Examination of these results and plots revealed six outliers. These cases (questionnaire numbers 27, 45, 72, 115, 132, and 162) were subsequently removed.

5.3.3 Reliability of observed variables

The reliability of the measures was assessed by examining the internal consistency (Cronbach's alpha) of the items for each dimension. Cronbach's alpha ranges from 0 to 1, with values .60 to .70 deemed the lower limit of acceptability (Hair et al., 2006). Most latent constructs and subscales were found to be reliable. Only two subscales; 'community activism' and 'responsibility' were found to have a Cronbach's alpha of less than .70. Analysis suggested that if question 14p was removed, community activism's reliability would improve from .660 to .713. This item is a negatively worded item and for theoretical reasons was thus removed (the assumption that negatively worded items measure the same construct as positively worded items, a popular practice pre-1970s to control for response bias, has been questioned in recent times; for more see DiStefano & Motl, 2006; Horan, DiStefano, & Motl, 2003; Marsh, 1986).

The responsibility variable, which was measured by four items, was found to be measuring two distinct factors when factor analysis was conducted; one about the person's sense of responsibility, and the other measuring the person's perception of authorities' (e.g., government) responsibility to ensure communities prepare for bushfires. This suggests that own responsibility and others' responsibility do not represent two opposing ends on a continuum, but rather that community members may believe that both themselves and government agencies have roles to play in ensuring communities are prepared for bushfire. As the theoretical model was interested in the effect of community members' perception of their own responsibility of preparing, the responsibility variable was revised to reflect this, and thus including only two items.

As recommended by the reliability analysis, other items, as long as it was theoretically justifiable, were removed to improve the Cronbach's alpha of that measure. Most of the items removed were either negatively worded items, or items that were not relevant to the target communities. For example the place attachment item, 'visiting this area says a lot about who I am', was removed as the majority of participants were residents of the areas sampled, not visitors. Feedback from the questionnaire (where residents had made written comments on the questionnaire) also suggested that this question confused respondents (e.g., 'the above questions need work' and 'What area?'). Therefore, all variables except the measure of responsibility reported reliability levels of above .70. Table 6 provides a summary of the measures, the item number, and Cronbach's alpha pre and post item reduction.

5.3.4 Descriptive data and results

In total, 188 questionnaires were returned. Participants' gender, age, relationship status, residency status and other descriptive variables are described in Table 7.

Males made up 57.75 per cent of the participants sampled, with one participant ticking both male and female under gender, indicating (it was assumed) that residents of that household included both a male and a female. Another participant did not indicate their gender. The largest proportion of the sample were made up of participants in the above 60 age group (35.30%), which is most likely attributed to the fact that the questionnaire asked that the oldest person in the household to complete the questionnaire, and also that many of the target areas (e.g., Binalong Bay) have a large proportion of retirees due to their popular holidaying locations.

Less than 1 per cent of the sample consisted of renters, and most participants had bought (54.50%) rather than built (39.57%) their home. Most residents had lived in their current locality less than 10 years (46.52%), with the mean residency being 15.30 years. The average length of time residents had lived in their current home was 12.90 years.

Table 6

Reliability Analysis of Latent Constructs, Subscales, and Measure Items

Latent Construct	Subscales	No. of Items		Cronbach's Alpha	
		Initial	Revised	Initial	Revised
Sense of Community					
	PSoC	10		**.923**	
	Attraction	4		**.822**	
	Neighbourly	3		**.833**	
	Total	*18*		***.930***	
Positive Outcome Expectancy		5		.804	
	Remove 12j		4		**.820**
Negative Outcome Expectancy		5		**.**609	
	Remove 12b		4		**.618**
Empowerment	Self esteem	9		**.921**	
	Community Activism	6		.660	
	Remove 14p		5		**.713**
	Optimism	4		**.741**	
	Total	*18*		***.906***	
Responsibility		4		.013	
	Remove 17b, 17d		2		**.580**
Place Attachment	Place Identity	6		.901	
	Remove 18j		5		**.907**
	Place Dependence	6		.852	
	Remove 18l		5		**.880**
	Total	*10*		***.905***	
Trust		9		**.914**	

Note.: PSoC – Psychological Sense of Community

Table 7

Frequencies of Descriptive Data

Variable	Break down	Count	Variable	Break down	Count
Gender	Male	108	Children at Home	Yes	74
	Female	77		No	113
	Missing	2			
			Children's Age	0-2	12
Age	<25	0		3-5	10
	25-30	5		6-10	12
	31-40	23		11-15	13
	41-50	39		16-18	6
	51-60	52		>18	21
	>60	66		N/A	113
Education	Year 10	17	Job	Retired	55
	Year 11	1		Unemployed	8
	Year 12	17		Employed	122
	Trade Cert.	13		Missing	2
	TAFE	13			
	Undergrad	45	Relationship Status	Single	14
	Grad. Dip.	25		Married/Defacto	153
	Masters	21		Divorced	13
	PhD	6		Separated	1
Other (e.g., Year 9, Nurse)		19		Widowed	6
	Missing	10			
Own/Rent	Own	178	Time in Area	0-10	87
	Rent	9		11-20	46
				21-30	27
Built?	Bought	102		31-40	18
	Built	74		41-50	5
	Other	8		51-60	1
	Missing	3		Missing	3
				Mean	15.53
Residency	Full time	170			
	Part time	15	Time in Home	Mean	12.9
	Visitor	2			

Most participants indicated that they were married or in defacto relationships (81.81%) and 39.97 per cent had children living at home with them. Of the participants with children, 63.51 per cent indicated having a child younger than 16 years of age living with them. Most residents indicating being currently employed (65.24%), and almost a third of the sample indicating being retired (29.41%). Less than 5 per cent of the sample indicated being unemployed. The highest level of education most frequently reported by the sample was an undergraduate degree (24.06%), with more than half (51.87%) holding a tertiary qualification.

The measures included in the Bushfire Preparedness Questionnaire proposed to influence people's decisions to adopt bushfire preparedness measures are presented in Table 8. This table provides the means, standard deviations, and ranges of the variables used for further analysis.

Table 8

Means, Standard Deviations, and Ranges of Questionnaire Variables

Variables	Mean	*SD*	Range
Positive outcome expectancy	15.47	2.78	6.00 – 20.00
Negative outcome expectancy	10.11	2.81	5.00 – 17.00
Place attachment	36.63	5.95	20.00 – 50.00
Responsibility	8.56	1.10	4.00 – 10.00
Sense of community	51.99	9.68	21.00 – 70.00
Community involvement	2.68	2.98	.00 – 14.00
Empowerment	42.97	4.52	32.00 – 52.00
Trust	33.87	5.84	12.00 – 45.00
Intention to prepare	6.59	4.02	.00 – 15.00
Actual preparedness	3.12	2.33	.00 – 9.00

Note.: *SD* = Standard Deviation; n = 188

Table 8 reiterates the study's premonition that residents living in bushfire-risk areas in Tasmania, due to their relative infrequent exposure to bushfire events, will not have adopted high levels of bushfire preparedness. As demonstrated by the table, the mean preparedness score was 3.12 which suggests that on average, the residents sampled had only adopted around a third of the recommended bushfire preparedness measures. Residents' average intention to prepare score (m = 6.59, range = .00-15.00) was similarly low.

To test the proposed theoretical Social Attachment Model of Bushfire Preparedness (Figure 2), the data obtained from the Questionnaire was subjected to structural equation modeling (SEM) analysis. The justification for SEM use, procedure and results obtained are detailed in following section.

Chapter Six – Modeling Bushfire Preparedness

6.1 Introduction

Due to its ability to test theory based models that attempt to explain connections and interdependencies between groups of variables (Byrne, 2001; Hu & Bentler, 1998), structural equation modeling (SEM) was utilised to determine if the theoretical Social Attachment Model of Bushfire Preparedness fit the data obtained from Tasmanian residents. SEM is a multivariate method of analysis that combines factor analysis, multiple regression analysis, and path analysis. As such, it is not limited to analysing specific relationships between constructs as are the above mentioned general linear models, but can assess a model as a whole (Weston & Gore, 2006). This is especially pertinent to the present study which argues that individuals' decisions are a function of their interaction with other people in their community and the quality of their relationship with emergency management agencies. SEM thus allows these multiple relationships and interrelationships to be analysed simultaneously providing an integrated picture of the reasoning process that ensues in deciding to prepare or not prepare for bushfires.

Another important feature of SEM that distinguishes it from other general liner models is its ability to account for measurement error, thus improving statistical estimation of the hypothesised model (Byrne, 2001; Weston & Gore, 2006). Due to the nature of the subjects studied in social sciences, individuals, groups, communities, and the inherent measurement error associated with data collected from such sources (e.g., response bias, researcher bias etc.), moderate amounts of error are usually present within measured constructs and variables. This has the potential of biasing results to an unknown degree or direction (Byrne, 2001). By using SEM to estimate hypothesised relationships, measurement error contained

within measured variables is accounted for, improving the estimation process and providing a more accurate model to fit the observed data.

Jöreskog and Sörbom (1996) suggest there are three approaches to statistical modeling including: a) a strictly confirmatory situation where a single proposed model is either accepted or rejected, b) alternative models or proposed competing models are tested and one is selected, and c) the Model generating situation in which an initial model is specified and if it does not fit the data, it is modified (re-specified) and repeatedly tested until some fit is obtained. The authors suggest that the latter approach is most common as most researchers are simply not willing to reject a proposed model without at least suggesting some alternative model.

In AMOS (version 18.0.2.) re-specification of models is aided by the provision of 'modification indices', which are generated using several well-known fit function criteria in an automated exploratory specification search procedure. The automated exploratory specification search procedure yields a ranking of the top ten *best* models by default giving several fit function criteria. The researcher however, must ultimately choose which *best* model to retain. This specification technique, which generates all-possible subset models and their set of fit function criteria, has been embraced by researchers as a suitable approach for guiding researchers to select the best fitting model (Schumacker, 2006a).

As such, the proposed Social Attachment Model of Bushfire Preparedness was analysed using SEM, conducted in the AMOS (version 18.0.2.) software utilising the default maximum likelihood estimation. Model analysis was conducted in two stages; first, the measurement model was tested to confirm that the measured variables did in fact relate to the latent variables (or factors/constructs; e.g., sense of

community), and secondly, the structural model, which shows the direct and indirect effects or paths connecting the latent variables, was tested to determine how well the theorised model fit the data (Aiken, Stein, & Bentler, 1994; Breckler, 1990).

6.2 Method

6.2.1 Data, missing data, and sample size

As detailed in Chapter Five, 188 questionnaires were returned and available for analysis. As returned questionnaires contained less than 6 per cent missing data (deemed acceptable by Byrne, 2001) they were replaced with the item mean substitution (Tabachnick & Fidell, 2007) (see Chapter 5 for full details). While there are no absolute rules for sample size when conducting SEM, a number of guidelines are available (Ullman, 2007). As SEM is a combination of factor analysis, multiple regressions and path analysis, a large sample size is necessary. Hair, Anderson, Tatham, and Black (1998, p. 605) recommend a sample size between 100 and 200 to achieve adequate power in structural equation modeling.

One hundred and eighty eight observations (180 after outliers were removed, see following section) made up the data set for testing the Social Attachment Model of Bushfire Preparedness. Based on Hair et al.'s (1998) recommendation and AMOS's use of the maximum likelihood estimation in its analyses, this sample size was considered acceptable for obtaining adequate power.

6.2.2 Outliers

Tests for univariate and multivariate outliers were conducted as the presence of either of these can greatly distort model fit. Six univariate outliers were found and removed (see Chapter 5). In AMOS, the test for multivariate outliers is conducted using the Mahalanobis distance statistic. This statistic tests the distance of each case from the centroid (mean) of the remaining cases. The distance is calculated through the use of the χ^2 statistic and AMOS produces a listing of the top one hundred observations ranked in order of their Mahalanobis distance. Two additional statistics are provided in the AMOS output, p1 and p2. The p1 column shows the probability of any observation exceeding the χ^2 Mahalanobis distance of that observation. The p2 column shows the probability that the largest squared distance of any observation exceeding the Mahalanobis distance calculated (see Appendix N for output). Arbuckle (1995) suggests, as a guideline for determining which observations may be outliers, that small numbers in the p1 column are to be expected but that small numbers in the p2 column may indicate that observations are improbably far from the centroid and thus may represent outliers.

To determine which, if any, of the observations in the original data set were outliers, all observations in the p2 were column with values less than .05 were individually examined. This analysis revealed 35 potential outliers; however upon re-examination of each individual questionnaire, only two were deemed outliers (questionnaire number 52 and 141) and were removed. This was justified by the fact that these two cases reported significantly lower perceived place attachment and sense of community scores (Byrne, 2001; Ullman, 2007).

6.2.3 Assumptions of normality, linearity, homoscedasticity and independence of errors

Assumptions of linearity, normality, homoscedasticity, and independence of errors were found to be acceptable. Analysis of residuals allowed the simultaneous testing of these assumptions. Multiple regressions were used to provide a residuals scatterplot showing whether the residuals (difference between the actual and predicted dependent variables scores) met assumptions of linearity, normality, and homoscedasticity. Assumptions of the independence of errors were tested by Durbin-Watson statistic. Ranging from 0 to 4, a value close to 2 indicates residuals are uncorrelated. As a rule of thumb, values close to 2 (not less than 1, not greater than 3) are deemed acceptable. An obtained value of 2.22 suggested that the error deviations were uncorrelated (Field, 2005; Hair et al., 2006; Ullman, 2007).

6.2.4 Multicollinearity

To ascertain whether the assumption of collinearity had been breached (i.e., if variables were too closely correlated) all items of the questionnaire were placed in a correlational matrix (Table 9) (Ullman, 2007). The matrix examines the relationship between the variables and determines whether the items are suitable for inclusion in the Model. Table 9 shows that the correlations are moderate, with the highest correlation (r = .52) being between ‘sense of community’ and ‘place attachment’. The moderate correlation indicates that multicollinearity is not an issue with these data set, suggesting that the variables do not contain redundant information.

Table 9

Correlation Matrix of Individual and Social Predictors for Bushfire Risk Area

		1	2	3	4	5	6	7	8	9	10
1	Actual Preparedness	_									
2	Intention to Prepare	.49**	_								
3	Sense of Community	.17*	.05	_							
4	Community Involvement	.25**	.05	.33**	_						
5	Negative Outcome Expectancy	-.27**	-.15*	-.37**	-.19*	_					
6	Positive Outcome Expectancy	.20**	.17*	.35**	.15*	-.43**	_				
7	Empowerment	.03	.04	.27**	.13	-.26**	.37**	_			
8	Responsibility	.35**	.36**	.34**	.19*	-.44**	.45**	.38**	_		
9	Place Attachment	.15*	.08	.49**	.32**	-.37**	.40**	.39**	.27**	_	
10	Agency Trust	-.11	.01	.18*	-.02	-.23**	.35**	.25**	.20**	.25**	-

N = 180

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

6.2.5 Goodness-of-fit indices

The benefit of SEM is that it allows for the entire model to be tested against the data. As such, how well the Model 'fits' the data is the output statistic that is measured. 'Goodness-of-fit' is measured by the chi-squared (χ^2) statistic which tests the size of the difference between the observed covariance matrix and the one predicted based on the Model. A model is considered a good fit to the data if there is a non-significant difference between the matrices. However, the chi-squared statistic is extremely sensitive to small samples (and also large sample sizes) and departures from multivariate normality, and as such, may result in the hypothesised model failing to fit the data (Ullman, 2007). Therefore, and consistent with recommendations (e.g., Bentler & Bonett, 1980; Hu & Bentler, 1999; Miles & Shevlin, 2007; Weston & Gore, 2006), multiple fit indices were used to assess the overall fit of the measurement model. A description of each of the fit indices used to test the proposed model therefore follows.

Due to the recognised sensitivity of the χ^2 statistic to small sample sizes, Hu and Bentler (1998) recommend using the Relative Chi-square or Normed Chi-square (CMIN/DF) which is the chi-square fit index divided by degrees of freedom. This norming is an attempt to make the Model chi-square less dependent on sample size. Ullman (2007) suggests that 2 or less reflects a good fit.

The Standardised Root Mean Square Residual (SRMR) is a standardised version of RMR (Root Mean Square Residual) and is the average difference between the predicted and observed covariances in the Model, based on standardised residuals. Standardised residuals are fitted residuals divided by the standard error of residuals. SRMR is less sensitive to sample size and distribution and is thus

recommended for use with sample sizes of less than 250 (Hu & Bentler, 1998). The smaller the SRMR, the better the Model fit, whilst an SRMR value of 0 indicates a perfect fit. A cut-off value of less than .08 is generally agreed to indicate a good fit (Hu & Bentler, 1999; Ullman, 2007).

Furthermore, due to their limited bias to sample size, the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Incremental Fit Index (IFI) are also reported. These goodness-of-fit measures compare the researcher's model to the fit of another model, usually the independence model.

The CFI compares the existing model fit with a null model which assumes the latent variables in the Model are uncorrelated (the 'independence model'). That is, it compares the null model with the observed covariance matrix to gauge the per cent of lack of fit which is accounted for by going from the null model to the researcher's SEM model. As the IFI is calculated based on the degrees of freedom in the Model, it is relatively independent of sample size, and is thus favoured by many researchers. For the CFI and IFI statistics, values range from 0-1 with values over .95 indicating a good fit, and values between .95 and .90 indicating an acceptable fit (Ullman, 2007).

The Tucker-Lewis Index (TLI) is also relatively independent of sample size and also controls for model complexity. Similar to CFI and IFI, a TLI value close to 1 indicates a good fit. Hu and Bentler (1998) and Schumacker (2006) recommend that a TLI value greater or equal to.95 is the cut-off value for good model fit. TLI values below .90 indicate a need to re-specify the Model.

The Root Mean Square Error of Approximation (RMSEA) measures the discrepancy per degree of freedom and estimates the lack of fit in a model compared

to a perfect model, with values less than .05 indicating a good fit. The PCLOSE (*p* of Close Fit) tests the null hypothesis that RMSEA equals .05 which would indicate a close-fitting model. If PCLOSE is greater than .05 (i.e., not statistically significant), then the Model is deemed to be a close fit to the data. If PCLOSE is less than .05 it is concluded that the Model's fit is worse than close fitting (i.e., the RMSEA is greater than .05). Further description of these fit indices are provided by Bentler and Bonett (1980) and Ullman (2007).

It is important to point out that, as alluded to in the above discussion, the threshold levels or cut-off values for fit indices are a guide only. As Millsap (2007, p. 876) posits, "these thresholds were originally meant to be rough suggestions for boundaries, but many investigators ignore their provisional nature and instead regard them as firm markers of model acceptance". Several recent studies have even argued against the use of cut-off values due to the lack of empirical evidence to support these postulations (Barrett, 2007; Markland, 2007; McIntosh, 2007; Millsap, 2007; Mulaik, 2007; Steiger, 2007). As such, and seemingly the only agreed directive, is that since the chi-squared statistic cannot be relied on alone to provide goodness of model fit information, additional fit indices should also be reported to provide alternative information in interpreting the chi-squared statistic. Therefore, the chi-squared statistic as well as the CMIN/DF, SRMR, CFI, IFI, TLI, RMSEA, and PClose are provided for assessment of model fit (Table 10 provides the results of model analyses).

Before the proposed Social Attachment Model of Bushfire Preparedness could be tested, that is, the structural model of how selected variables interrelate to predict adopting actual bushfire preparedness measures, the measurement model was tested to ensure the validity and reliability of the multiple indicators of the variables

measured. The goodness-of-fit analyses (and description) of both the measurement model and structural model are therefore provided in the following results section.

6.3 Results

6.3.1 The measurement model

The measurement model, which deals with the latent variables and their indicators, is evaluated like any other SEM model using the goodness-of-fit measures discussed above. However, testing the measurement model is called confirmatory factor analysis (CFA) and is used to confirm that the indicators sort themselves into factors corresponding to how the researcher has linked the indicators to the latent variables. As such, CFA was used to determine if the 22 observed variables adequately loaded on the seven latent variables (negative outcome expectancy, positive outcome expectancy, place attachment, sense of community, empowerment, trust, and responsibility) (see Appendix O for analysis output). As advised by Byrne (2001), when the measurement model was tested all latent constructs were allowed to be intercorrelated, each item was allowed to load on one latent construct only, and all factor loadings were estimated. Figure 4 shows the measurement model.

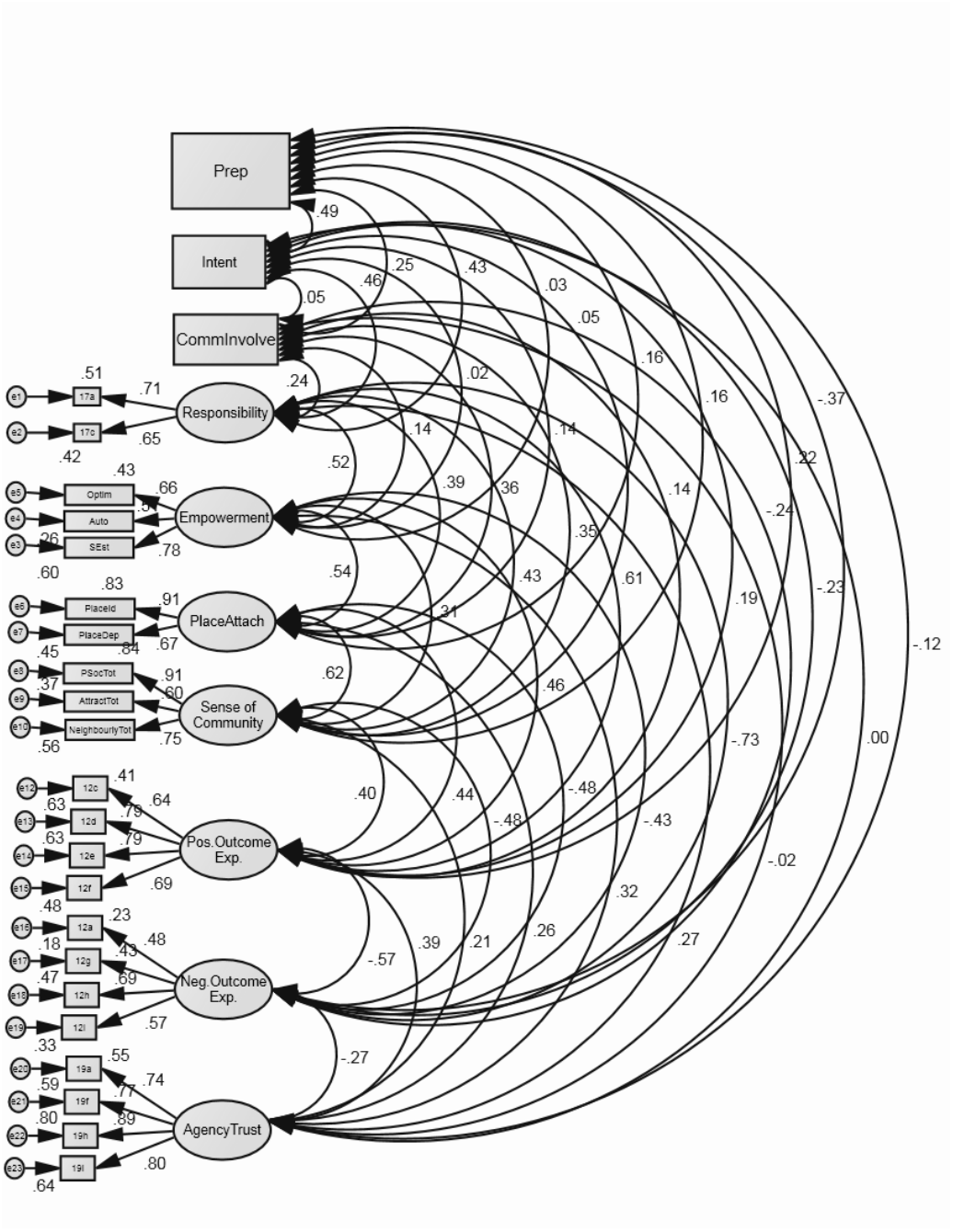

Figure 4. Measurement model (refer to section 5.2.2 for description of variables).

Although the chi-squared value suggested that the measurement model did not provide a good fit to the data, χ^2 (*df* = 233, n = 180) = 392.220, *p* = .000, the CMIN/DF (less than 2), SRMR (less than .08), CFI and IFI (greater than .90) fit indices imply that the Model provides an acceptable fit to the data. Table 10 provides a summary of the fit indices for the measurement model.

Table 10

Chi-squared and Goodness-of-fit Indices for Measurement, Structural, and Revised Social Attachment Model of Bushfire Preparedness

Model	χ2 (*df*)	*p*	CMIN/DF	SRMR	CFI	IFI	TLI	RMSEA (90% Confidence Interval)	PClose
Measurement model	392.220 (233)	.000	1.683	.0667	.902	.906	.873	.062 (.051 - .072)	.037
Proposed model	535.718 (262)	.000	2.045	.1476	.827	.831	.802	.076 (.067 - .086)	.000
Revised model	321.786 (177)	.001	1.374	.0729	.949	.950	.941	.044 (.031 - .056)	.786

6.3.2 The structural model

Testing of the proposed Social Attachment Model of Bushfire Preparedness (Figure 2) was conducted by testing the structural model in the AMOS program. The structural model did not provide a good fit to the data, χ^2 (df = 262, n = 180) = 535.718, p = .000 (see Appendix O for analysis output). Figure 5 presents the tested proposed Social Attachment Model of Bushfire Preparedness. Additional fit indices summarised in Table 10 (Proposed Model) suggest that the Model provided a poor fit to the data.

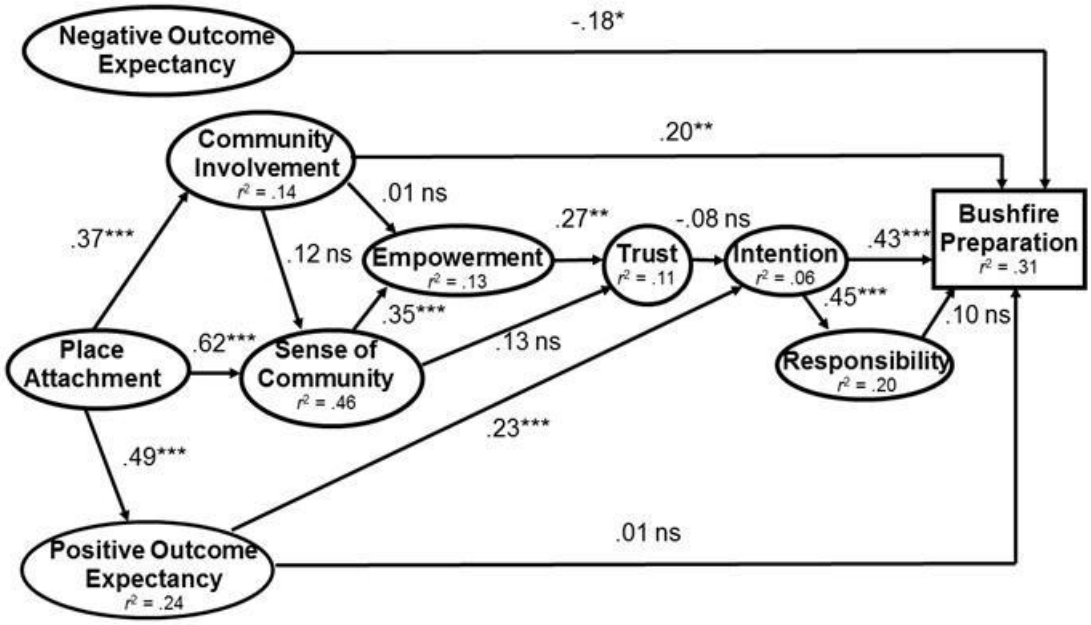

Figure 5. The proposed structural model showing the relative strength of standardised path coefficients. Correlations are significant at the *** = .001 level, ** = .01 level; * = .05 level (all 2-tailed); ns = non-significant.

The numbers adjacent to each causal path indicate the strength of the relationship between the two variables (the closer the number is to 1 the stronger the relationship). The r^2 value indicates the percentage of the overall model variance that is explained by that variable. In this case, the individual and social factors that make

up the Model combine to account for 31 per cent of the variance in actual preparedness.

As the proposed structural Social Attachment Model of Bushfire Preparedness did not fit the data, re-specification analysis was employed (as discussed in section 6.1) to provide a model that better accounted for the data.

6.3.3 The revised model

In a bid to identify a more parsimonious model that better described the data, two dimensions of the sense of community measure were removed due to their measuring similar constructs already represented in the Model. As such, neighbouring (similar to community involvement) and attraction (similar to place attachment) were removed. It was predicted that by removing these dimensions the Model would better represent the data.

Furthermore, trust, which in previous studies of infrequently occurring hazards has been found to mediate the relationship between community variables and intention to prepare, was removed. This was justified by the fact that it did not provide a significant contribution to intention to prepare in the proposed model ($p > .05$), tentatively suggesting that residents did not perceive the hazard of bushfire to be unfamiliar enough to warrant a reliance on expert advice to move to adopting preparedness measures. This may reflect the annual occurrence of, although not life threatening, grass and bushfires across the state of Tasmania. As such, bushfires do not present an uncertain or unfamiliar hazard, or at least not perceived so by community members, and therefore they do not need to rely on agency sources to provide them with accurate and detailed information. This proposition is only

tentatively suggested and requires further exploration. As such, the issue of trust will be explored in the qualitative component of the study presented in Chapter Eight.

Due to the poor fit of the proposed theoretical model and after making the above mentioned modifications, a specification search was conducted to suggest an alternative model that better accounted for the data (Schumacker, 2006a). The AMOS specification search procedure provides the researcher with all-possible subset models and corresponding fit indices to aid the researcher in selecting the most theoretically correct and appropriate model.

The fit indices for the revised Social Attachment Model of Bushfire Preparedness (Figure 6) indicated that it provided a better fit to the data, χ^2 (df = 177, n = 180) = 321.786, p = .000 (see Table 10 for chi-square and goodness-of-fit indices) and accounted for 34 per cent of the variance of preparing for bushfires.

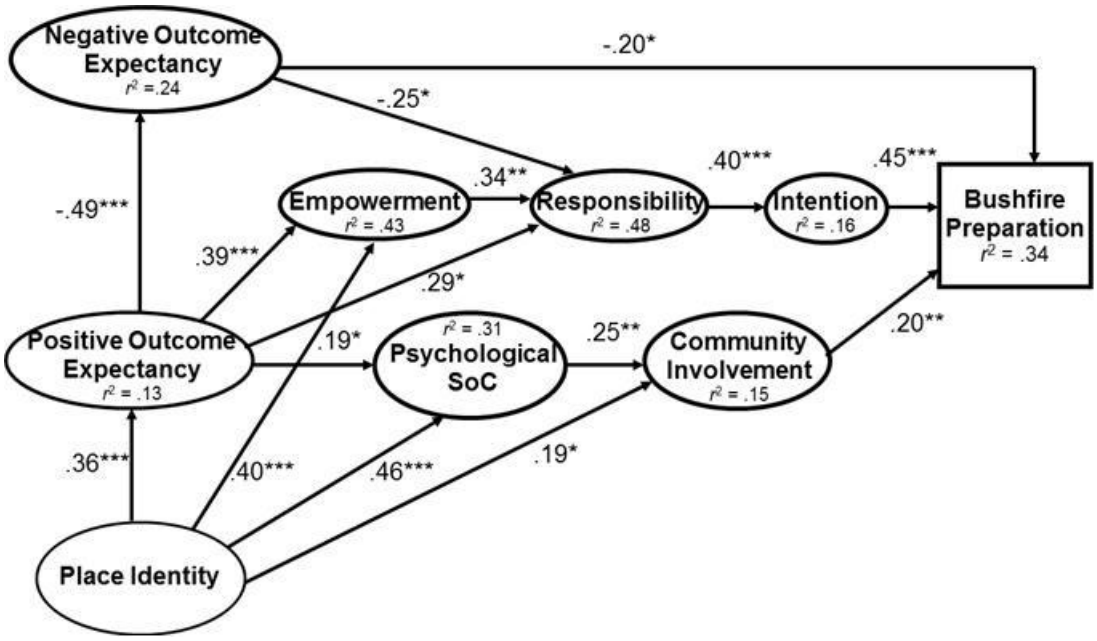

Figure 6. (Revised) Social Attachment Model of Bushfire Preparedness.

All the pathways shown in the Model are significant (see Appendix O for analysis output). The Model portrays the influences of the social environmental factors in the bushfire preparedness decision making process, with actual preparedness accounting for 34 per cent of the variance. The Model also confirmed the role of place attachment as an integral factor in deciding whether to prepare for bushfires or not. The Model also shows that for bushfire prone communities in Tasmania, personal responsibility for preparing accounts for 48 per cent of the total amount of variance in the Model. Each variable and its influence in the bushfire preparedness decision process will now be discussed to provide a more complete picture of the individual and social processes that affect residents' decision making.

6.4 Discussion

The original, hypothesised model was supported but several issues with its analysis suggested a need for additional work. As such, a revised Social Attachment Model of Bushfire Preparedness was tested and overall, the fit indices (Table 10) indicate that it provided a good fit to the data from Tasmanian residents. While accounting for 31 per cent of the variance is a good effect size (Sheeran, 2002), it also suggests the influence of additional variables not accounted for. Exploration of what these variables may be is conducted in the qualitative component of the study (see Chapter 8). What this work does do is identify the need to give social variables a prominent role in how people interpret hazard issues.

These results support the utility of the Model as a device to assist understanding decisions to prepare for bushfire hazard consequences. This revised Social Attachment Model of Bushfire Preparedness (Figure 6) provides a better representation of the data than the proposed model of bushfire preparedness (Figure 5). This section will thus detail why the revised model is a better fit than the

proposed model by first outlining how the revised model differed from the originally proposed model, and then exploring and describing each component of the Model and how these factors interact to influence people's decisions to prepare.

As alluded to in section 6.3.3, in an attempt to provide a more accurate model of the Tasmanian data, close re-examination of the variables included was undertaken. This suggested that two dimensions of the original sense of community scale, neighbouring and attraction too closely resembled (and thus measured) two other variables, community involvement and place attachment respectively, already included. As such, the revised model included only the dimension 'psychological sense of community' which describes a sense of belonging, mutual support, and a shared belief that residents' needs will be met by their commitment to each other (this factor will be discussed in more detail below).

Trust was not included in the revised model due to it failing to significantly contribute to the originally proposed model. The expected role of trust (in civic sources of risk/hazard information) was thus not supported, and as the relationship between trust and intention to prepare was negligible (r = -.08, p > .05) it is unlikely that this could be attributed to sample size issues. Although this is inconsistent with previous literature (Paton, 2007b; Prior & Paton, 2008; Siegrist, Cvetkovich, & Roth, 2000), as explained in section 6.3.3, this may reflect the relative high frequency of bushfires, although rarely major or life threatening, in Tasmania.

Previous literature suggests that trust only becomes significant when residents have to make decisions under conditions of uncertainty and have to rely on agencies to provide the information (Paton, 2008). If bushfires are a relatively frequent occurring event, residents may not necessarily feel uncertain about such a

scenario, thus reducing their need to seek further advice from a trusted source. As such, further exploration of the community-agency relationship is needed. This will subsequently be addressed in the qualitative component of the study provided in Chapter Eight.

Discussion will now turn to explaining the individual and social processes that can influence bushfire preparedness by reviewing the position and relationships of each of variables in the revised Social Attachment Model of Bushfire Preparedness. As the Model describes factors acting in a relatively sequential process to influence preparedness, the following discussion will thus follow in a corresponding order.

6.4.1 Place attachment

As predicted, place attachment was found to play a fundamental role as an antecedent of the bushfire preparedness decision making process. The fact that residents purposely choose to live in environments that are, incidentally, at risk of bushfires (e.g., peri-urban communities, tree-changer communities) demonstrates the strength of attachment some community members have for the place they live. As defined in section 2.6.1, place attachment, or the bond and fondness an individual (or community) feels towards a place and the components of that place (e.g., social networks within it), may represent a component of an individual's self-identity (Kyle et al., 2005).

Place attachment was hypothesised to predict people forming positive outcome expectancies. This was supported by the Model which demonstrated a strong relationship between place attachment and positive outcome expectancy (r = .36, p < .001) (see Figure 6). This supports previous mixed-method and case study

research which suggest that high place attachment was related to higher levels of both individual and collective bushfire preparedness (Jakes, Kruger, et al., 2007; Paton, Bürgelt, et al., 2008). Individuals with a strong attachment to place would want to protect this entity they value so highly and defend their ability to continue enjoying it. Furthermore, due to their high value judgement about the natural environment that constitutes a considerable component of this 'place', these individuals may have immense confidence in their environment's ability to provide protection from negative bushfire consequences (e.g., green vegetation is poor fuel, trees can catch embers) and as such, more easily develop positive outcome expectancies (cost/benefit analysis) of the ability of preparedness measures to mitigate negative bushfire consequences.

The ability of place attachment to predict the community variables psychological sense of community ($r = .46$, $p < .001$) and community involvement ($r = .19$, $p < .05$) was also supported by the Model. As explained in section 2.6.1., place attachment develops through an individual's interaction with the place, and therefore the elements within it which may include other people who share a similar attachment to the place (Kyle et al., 2005). Furthermore, due to residents' feelings towards a community being affected by their social investment within their neighbourhood (community involvement), the more close friends a resident has within that community, the stronger an attachment they would feel to that community. As such, place attachment is an important component of social and community variables (Mesch & Manor, 1998).

In recognition of the fundamental role of place attachment in individuals' early stages of deciding to prepare for bushfires or not, agencies could develop education initiatives designed to highlight the benefit of adopting bushfire

preparedness measures that protect the living environment and the mitigation measures which still allow residents to enjoy the elements of the place they value so much. For example, if fire agencies amended their bushfire education message and literature to accommodate more of the natural environment (instead of insisting a 30 metre cleared radius around the home) and promoted more heavily the benefits of the natural environment (e.g., trees can act to catch embers, certain species of non-flammable plants, and green lawn), they would meet less resistance and by focussing on the focus of residents' attachment, actually promote the adoption of bushfire preparedness measures (rather than continuing with the 'same-old' fear campaigns).

6.4.2 Outcome expectancies

As hypothesised, the key role of outcome expectancies as indicators of people's general cost-benefit appraisal was supported. The Model (Figure 6) supports earlier work on negative outcome expectancy and indicates that it acts to reduce the likelihood of preparing. In contrast, positive outcome expectancy was a significant predictor and mediated the relationship between place identity and the social variables (Figure 6) and the formation of intentions to prepare. The separate roles played by positive and negative outcome expectancy demonstrate that decisions to prepare or not prepare may, at least partially, reflect different ways of understanding how people relate to environmental hazards.

Positive outcome expectancy. The revised Social Attachment Model of Bushfire Preparedness (Figure 6) failed to support the existence of a direct relationship between positive outcome expectancy and either intentions to prepare or actual bushfire preparedness. Rather it suggested that this relationship was mediated by community variables (psychological sense of community and community involvement), perceptions of individual responsibility, and empowerment. As such,

the Model explains how individuals who perceive that the benefits of preparing for bushfire outweigh the costs, perceive the desired outcomes as achievable and believe that it is their responsibility to adopt these measures to safeguard themselves, are more likely to adopt actual preparedness behaviour.

The additional mediating pathway from positive outcome expectancy to empowerment, and then responsibility and actual preparedness, suggests that for some people the support of external sources, and their resultant feeling of personal control and mastery over hazard consequences, is necessary for them to adopt preparedness measures. This relationship supports previous research (Paton, Smith, et al., 2008) which found that empowerment mediated the relationship between positive outcome expectancy and intentions to prepare in a study of volcanic hazard preparedness.

For other people who do not feel empowered by agencies to make becoming prepared their own responsibility, the Model explains that additional information and support from referents within the community is required before the successful adoption of bushfire protective measures. This is indicated by the relationship between positive outcome expectancy, psychological sense of community, community involvement, and actual preparedness. In the absence of sufficient personal knowledge to mitigate their personal risk, positive attitudes towards the efficacy of protective measures prompts individuals to turn to highly regarded referents within their community and through this interaction with others advance their risk management planning. As such, through the discussion of hazard issues with people who are in a similar situation (and thus whose opinion is valued), residents fill the gaps in their knowledge allowing them to effectively adopt preparedness measures.

To increase positive outcome expectancies agencies could conduct education programs designed to provide specific advice on how to prepare for bushfires rather than focussing on the risk and potential negative consequences (Paton & Wright, 2008). Focussing on the benefits of preparing will also help reduce the uncertainty surrounding bushfire hazards and increase people's positive beliefs about the efficacy of adopting preparedness behaviours (Slovic & Peters, 2006). By developing positive outcome expectancies in residents, they will feel motivated to engage with others in their community to obtain further information on how they can effectively prepare for bushfires and feel empowered by these agencies to feel a personal sense of control over their risk management.

Negative outcome expectancy. The analysis also offered some support for the hypothesised role of negative outcome expectancies in predicting a reduction in the likelihood of people actually adopting bushfire preparedness behaviour. Negative outcome expectancies, or people's belief that bushfire consequences are too destructive to render personal actions worthwhile, also predicted that people were more likely to believe that it was not their responsibility to prepare for bushfires. Support for negative outcome expectancies being separate beliefs (and not on a continuum) to positive outcome expectancy was supported by the negative relationship between these variables in the Model (Figure 6).

This has implications for how risk communication strategies are conceptualised, and suggests that not only should positive outcome expectancies be fostered, but negative outcome expectancy beliefs must be neutralised before attempting to commence bushfire preparedness promoting initiatives (Paton, Smith, et al., 2008). This introduces another source of diversity into the populations with whom agencies communicate. The negative pathway between positive outcome

expectancy and negative outcome expectancy suggests that if positive outcome expectancies can be promoted, as discussed in the earlier paragraph, this may go some way to reducing negative outcome expectancies. The Model also suggests that unless these negative outcome expectancies can be quelled, residents are unlikely to believe it is their responsibility to ensure their own preparedness and thus form intentions to prepare.

6.4.3 Psychological sense of community and community involvement

The revised Social Attachment Model of Bushfire Preparedness (Figure 6) supported the role of the community variables, psychological sense of community and community involvement, in mediating the relationship between the individual level factors (place attachment and positive outcome expectancy) and actual preparedness. The mediating role of these community variables between individual level predictors and agencies factors was not however supported.

The proposed Model hypothesised that place attachment would predict sense of community and community involvement which would in turn predict empowerment and then intentions to prepare. The revised Model instead explains how residents who require more information to be able to prepare for bushfire sufficiently acquire this through their community resources. This was demonstrated by the direct relationship between community involvement and actual bushfire preparedness. This suggests that residents do not always require the expert advice of agencies and supports the removal of trust (trust developed in agency sources as a result of providing specific and accurate information). The ability for the community to provide the necessary bushfire risk and preparedness information to reduce the uncertainty felt by its residents may be explained by the extensive collective knowledge and experience found in these communities and their long residing

residents (average 15 years). This may also reflect the existence of community narratives and norms surrounding bushfires present in these communities. This proposal will be explored in greater detail in the qualitative component of the study presented in Chapter Eight.

The finding that residents, in some circumstances obtain all, and in many cases most, of the relevant information and guidance required to reduce hazard uncertainty within their community, further supports this study's supposition that residents' social environment is fundamental in their interpretation of hazard risk information. It further highlights that community education programs aimed at increasing community bushfire preparedness cannot neglect residents' social environment, must include these social and attachment factors (e.g., place attachment, sense of community, community involvement), and therefore cannot hope to achieve positive and sustainable results unless they adopt a community engagement approach.

Community involvement (the extent to which community members actively participate in community activities with others) was hypothesised to predict the degree to which residents felt a sense of community (a feeling of belong and attachment towards a community). The revised Social Attachment Model of Bushfire Preparedness however, demonstrated that psychological sense of community predicted community involvement which in turn predicted actual bushfire preparedness. This can be explained by the understanding that the closer a resident feels to the community, and the people within it, the more likely they are to want to participate in, engage with, and contribute to, that community's betterment. As a result, the relationship identified by the Model between positive outcome expectancies and psychological sense of community suggests that interaction with

other likeminded people provides an avenue for assessment of the benefits associated with preparing and identifying community resources (Karanci, Aksit, & Dirik, 2005).

The use of everyday community activities (e.g., local sports team, community committees, church group, local environment group) to assess community involvement emphasises how incorporating bushfire preparedness initiatives into daily pursuits can facilitate preparing. As discussed in Chapter Three, when faced with uncertainty such as that provided by natural hazards, the community resources that residents draw on when making preparedness decisions will be the same as the ones they rely on in general day to day experiences. This finding is supported by Paton et al., (2010) who tested a model of tsunami preparedness on a Tasmanian sample and found that people's engagement with others within their social environment was a significant predictor of whether people form intentions to prepare. Jakes et al. (2003) and Kruger et al. (2003) similarly demonstrated the critical importance of community and agency involvement in facilitating community bushfire preparedness in their studies of bushfires in the United States.

As such, these findings support the inclusion of community input and community resources in bushfire mitigation and preparedness initiatives. An example of where this has been done is the Firewise Communities/USA which is a nationally run program in the United States which aims to provide residents with "knowledge and skills, and encourages residents in a neighbourhood to assess local risks and identify and implement measures suited to local conditions in order to reduce the impacts of wildfire on local properties and communities" (McGee, 2011, p. 2529).

The program is designed so that once an interested resident contacts the Firewise Communities' state representative, a visit to the community is scheduled, and assessment is conducted which is then presented to a the community Firewise board comprised of the local residents. This group of residents then use the assessment as the basis for developing an action plan for the community. The plan is developed by the local residents and reviewed by the state representative. The local residents are then responsibly for implementing the action in the plan and reporting progress back to the National organisation annually.

This initiative reflects the community engagement principles discussed in Chapter Three and demonstrates how by engaging local communities, providing an empowering setting for them to achieve their goals, a partnership between the community and fire agency built on mutual respect and trust is developed thereby facilitating effective future communication and affiliation. This will in turn not only promote the adoption of bushfire mitigation behaviours, increasing the community's overall preparedness, but promote the resilience of that community for future hazard events, thus aiding fire agencies more effectively facilitate their goal of reducing the bushfire risk of communities. How these qualities can be developed and facilitated by applying the Social Attachment Model of Bushfire Preparedness (Chapter 6, Figure 6) will be explored in the action research component of the study, the evaluation of the Pilot project, presented in Chapter Nine.

6.4.4 Responsibility

Support was found for the role of personal responsibility in predicting actual preparedness, but the revised model explained how this relationship was mediated by intention to prepare. This influential role of responsibility in predicting the adoption of bushfire preparedness measures is supported previous hazard literature (Lindell &

Whitney, 2000; Martin et al., 2009; Mulilis & Duval, 1997; Weinstein, 1989). The Model explains how intentions to prepare are predicted by individuals first perceiving it is their own responsibility to ensure they are prepared.

Responsibility was predicted by positive outcome expectancy, as discussed earlier, and empowerment. Residents who are supported by agency sources to build their capacity to confront bushfire hazards (e.g., are provided with accurate and specific information) are more likely to feel it is their responsibility to prepare for bushfires because they understand how to do so. This emphasises the above made point that agencies need to ensure that they provide detailed and specific advice to residents in how to prepare for bushfires, and that they explain that the limited resources and capacities of the fire agencies during a major bushfire render their ability to aid residents unlikely. Empowered with such information will result in residents being more likely to perceived that they are able to and responsible for their own bushfire preparedness (Schlenker et al., 1994), which will in turn foster the formation of intentions to prepare.

An important implication of this finding is that fire agencies should not simply emphasise that bushfire preparedness is a community's responsibility without simultaneously providing them with the information and resources to enable them to adequately prepare (Bird et al., 2010). Furthermore, and as a community engagement approach would advocate, explaining to residents why it is their responsibility to prepare (i.e., fire agencies during a major bushfire do not have the capacity or resources to protect every property) will empower them further and by providing them with accurate and more realistic information, allow them to make more informed preparedness decisions. As indicated in Chapter Five (Table 6) the variable 'responsibility' was only measured by two items and suggests that the future

exploration of this influential construct requires additional development. The influence of personal responsibility on bushfire preparedness is further explored in the study's qualitative component discussed in Chapter Eight, thus providing further support for its influential position within the Model.

6.4.5 Empowerment

The Social Attachment Model of Bushfire Preparedness demonstrated that empowerment was predicted by place attachment and positive outcome expectancy. Empowerment accounted for 44 per cent of the variance in the revised model. The finding that empowerment also predicted responsibility (which in turn predicted intention to prepare and actual preparedness) confirms the important role of empowerment reflecting the quality of relationship between community residents and the agencies. This is important as when faced with uncertainty (such as bushfires) people will turn to expert sources of information (e.g., fire agencies) if this information cannot be obtained from their usual everyday referents (e.g., other community members).

This has important implications for fire agencies and bushfire preparedness initiatives as by the time residents approach fire agencies for information they are seeking specific and detailed advice and information they have not been able to obtain elsewhere. As such, fire agencies may have to redesign their bushfire education material/presentations to acknowledge the fact that different community members may require different levels of information (e.g., basic, advanced). This position is supported by Martin, Bender, and Raish's (2007) research which warns fire agencies against treating communities as homogenous groups due to the different levels of residents' subjective bushfire knowledge and varying motivational

influences, and thus suggests the delivery of different types of information depending on the sub-group.

6.4.6 Intention to prepare and actually preparing for bushfires

Although the relationship between intention to prepare and actual preparedness was supported ($r = .45$, $p < .001$), it highlights the fact that even if people form intentions to prepare, have the knowledge and social support to adopt the measures, barriers such as cost and time (both with regard to the immediate demands on time and in relation to people believing that the next fire event will not occur until sometime in the future) hinder residents from actually adopting these measures. How such barriers can be addressed and overcome cannot be explained by the Model of bushfire preparedness presented here, and thus a deeper understanding and exploration of these barriers and the factors outlined in the Model is needed. The qualitative component of the study presented in Chapter Eight affords this opportunity.

Furthermore, although the Social Attachment Model of Bushfire Preparedness provides a general explanation of how individual and community factors effect and influence preparing for bushfires, it cannot be assumed that this influence is uniform across all communities. On the contrary, the community engagement approach described in section 3.3.1, assumes and utilises communities' unique characteristics and profiles to ensure that programs that are implemented are most appropriate for that community. Although the four communities selected for the present study shared the characteristic of being at-risk of bushfires due to their physical proximity to the urban/bush interface, each was chosen because of their distinctly different social profiles (e.g., Binalong Bay – holiday/lifestyle location; Bagdad – commuter/rural location) and thus would provide greater generalisability

of the study's results. These community differences, as well as population sub-groups (e.g., gender, young family, length of residency) identified in Chapter Five, thus provide an important avenue for identifying how and why certain communities and sub-groups consistently adopt varying levels of bushfire preparedness. Such information, as mentioned earlier, is invaluable in developing and implementing more tailored, sustainable, and thus effective community bushfire education initiatives. The following chapter thus presents the analysis and exploration of individual and community differences present in the sample of Tasmanian residents living in bushfire risk areas.

Chapter Seven – Testing for Individual and Community Differences in Bushfire Preparedness

The Bushfire Preparedness Questionnaire (see Chapter 5 for Questionnaire details; and Appendix A for full Questionnaire) included a series of demographic questions, questions about residents' current bushfire preparedness and bushfire awareness, and a battery of social and psychological measures. As the present research is interested in seeking explanation for differences in the extent to which people to adopt preparedness measures, univariate analysis of variances (ANOVA) were conducted to determine if some communities were significantly more prepared for bushfire than others, and whether certain sub-groups of the sample were more prepared than others. If this was the case, exploration of differences (through ANOVAs) of other demographic and psycho-social factors would shed light on the between-group differences that were likely to promote bushfire preparedness within a community. This information could therefore inform the development of the agency (TFS) initiated Bushfire Ready Communities Tasmania Pilot program (see section 3.3.3.1), which is dovetailed with the action research component of the present study (see Chapter 9), to ensure that such a program was tailored to the profile of the particular community, thus facilitating its efficacy.

7.1 Exploring Individual and Community Differences

The analyses in this section were conducted to determine the degree to which communities examined were similar or different. It is clear from the quantitative analysis conducted for the modeling (see Chapter 5) that variability in scores was evident. A second question is whether some of these differences arise from differences in community characteristics that would not be detected using modeling analysis. For example, while community involvement could be present in all

communities, this cannot be taken to imply that involvement arises for the same reasons and in the same ways in each community. Understanding this possible variability has both theoretical and practical implications. Theoretically, this information contributes to developing more comprehensive theory and more accurate measures, while practically, it offers invaluable information in accommodating community diversity and developing more effective community engagement programs.

The Model provided in Chapter Six (Figure 6) explains how bushfire preparedness can be predicted in terms of a generic set of individual, social, and agency factors. However, this model cannot account for individual differences of communities and the sample size did not allow for the model to be tested separately on each of the four communities. As such, to determine how some of the key variables of the Model varied across the target communities, analysis of variance (ANOVA) were conducted to determine between-group differences. Furthermore, variables that were not included in the Model, due to their inability to be manipulated and thus promote preparedness (e.g., gender, previous experience) were also compared so to provide a more detailed profile of each of these communities and thus facilitate more appropriate bushfire preparedness programs.

As such, between-group differences explored included location (target area) by preparedness and location by intention to prepare. Additionally, the effect of previous bushfire experience of both the resident and their family/friends on the resident's level of preparedness was also of interest. Previous research has presented mixed findings with regard to the effect of previous experience on preparedness, with some suggesting it increases the likelihood of mitigation measures being adopted (e.g., Anderson-Berry, 2003; McIvor et al., 2009), whilst others suggest that

at best it prompts residents to adopt some mitigation behaviours but not all (McGee et al., 2009). Other studies have found the opposite effect, with experience reducing the likelihood of preparedness measures being adopted due to a normalisation bias being implicated in explaining how past experience can increase risk perception but reduce actual preparedness (Paton, Johnston, Bebbington, et al., 2001).

Effects of familial influence on the adoption of behaviour have also been found to be important. Research suggests that if a person believes that significant others hold favourable attitudes towards a particular behaviour (e.g., preparing for bushfires), or if they believe that performing a specific action would be viewed favourably by significant others, they are more likely to perform that behaviour (Doll & Ajzen, 1992; McIvor et al., 2009). Therefore, whether a resident's family and friends' level of preparedness affected their own level of preparedness was an important research question. It was thus predicted that if significant others had prepared for bushfire, the resident too would adopt preparedness measures. Confirmation of the effect of important referents' attitudes and subsequent behaviour towards bushfire preparedness would further support this study's supposition that residents' social environment is fundamental in their interpretation of hazard information. It would thus also explain why some people continue to risk their lives by not preparing, regardless of their awareness of the risk.

Gender studies of bushfire preparedness suggest that due to the relative traditional gendered division of labour (within society, with women's domestic duties being centred more within the home and men's domestic duties more outside the home; discussed further in Chapter 10; Fothergill, 1998), men more often perform what is commonly seen as the 'customary' bushfire preparedness activities (e.g., operating fire pump, clearing of bush, slashing grass, burning off). As such,

women have had less experience with adopting bushfire mitigation practices and thus may indicate having adopted significantly less measures than men. Furthermore, as these measures are usually synonymous with the 'stay and defend' position, women may be less inclined to decide to 'stay and defend' and rather 'leave early'. Whether gender differences existed in adoption of bushfire preparedness measures, and whether decision to stay and defend or leave early differed as a function of gender, were important research questions.

7.1.1 ANOVA results of sub-group comparisons

One-way analyses of variances (ANOVAs) were conducted to determine if there were significant differences between the sub-groups discussed above. Levene's test for homogeneity of variances (test of whether the variances of the groups significantly differ) was calculated for each comparison, and will be assumed to be non-significant unless otherwise specified. If the groups do significantly differ, Welch's *F* is reported as the recommended adjustment (Field, 2005). Furthermore, to account for potential group invariance and due to unequal location sample sizes, the Games-Howell post-hoc procedure was applied to determine which of these group comparisons differed. Games-Howell is the post hoc procedure of choice when population variances differ and is also accurate when sample sizes are unequal (Field, 2005). Results of these comparisons are detailed in individual sections below.

7.1.1.1 Locality by intention to prepare and actual bushfire preparedness

Table 11 provides a summary of comparisons involving the target communities. A significant difference was found between the target communities and their level of preparation for bushfires, $F(7) = 3.87$, $p < .001$ (Table 11; see Appendix O for output). The fact that these communities were selected by the Tasmania Fire Service because they shared comparatively similar levels of physical

bushfire risk (i.e., from their relative proximity to specific forest species, topographical circumstances etc.), yet differed significantly in their level of bushfire adjustment adoptions, reemphasises that something other than physical risk predicts whether people prepare for bushfires.

Although the highest score achievable on the measure of preparedness was 15 (range: 0-15), residents' responses only ranged from 0 to 9. This suggests that even the most prepared residents in the sample had only adopted 60 per cent of recommended bushfire preparedness measures. The participants from the Kettering area reported the highest average level of preparation (m = 5.30, SD = 2.50), and residents from the Channel area (Coningham, Snug, Margate, and Electrona), the second highest (m = 4.04, SD = 1.93). Although the Kettering area reported the highest level of preparation, on average, these residents had only adopted about a third of recommended measures. This further supports the study's presumption that in general, residents living in communities at risk of bushfire are in general not adequately prepared. The Binalong Bay area (including St Helens, Bay of Fires, Scamander, and the Gardens) reported the lowest level of preparedness (m = 1.84, SD = 1.72). This level of preparedness was significantly lower than the Kettering, Snug, and Fern Tree areas. This is a surprising finding since neighbouring communities to Binalong Bay were affected by the 2004 East Coast fires (see section 2.1).

Intention to prepare (within the next 12 months) scores ranged from 0 to 15. Although residents from the Snug area (m = 8.08, SD = 4.44) reported significantly higher intention scores ($F(7) = 2.48$, $p < .05$) than residents in the Binalong Bay area (m = 4.68, SD = 3.83), who indicated the lowest intention to prepare, similar to the actual preparedness scores, this average score is approximately less than a third of

the highest possible intention to prepare score. Again this suggests that merely living in areas susceptible to bushfire risk is not enough to promote intention to prepare or actual preparedness adoption, and thus suggests other interpretive influences must be at play. The fact that Binalong Bay residents were amongst those least prepared and indicated lowest intentions to prepare for bushfire, reflects the moderate positive correlation between these two variables (r = .49; see Table 8) and introduces the need to conduct more in-depth analysis of how these communities differ and how such variance affects the residents' decision about bushfire risk and preparation.

Table 11

One-way Analysis of Variance between Communities and Key Variables

Location		Intention to Prepare		Actual Preparedness	
Range		*.00 – 15.00*		*.00 – 9.00*	
	n	*m*	*SD*	*m*	*SD*
Bagdad area	23	6.70	3.64	3.22	2.43
Binalong Bay area	37	*4.68*	*3.83*	*1.78*	*1.70*
Fern Tree area	58	7.50	3.84	3.31*	2.45
Kettering area	10	5.90	4.12	5.30*	2.50
Snug area	24	8.08*	4.44	3.92*	1.95
Middleton	9	7.33	4.36	3.22	2.39
Woodbridge	9	6.89	3.72	2.78	1.86
Other	3	4.00	1.73	3.67	2.89
Missing (area not indicated)	15				
Total	*173*	$F(7) = 2.48$, $p < .05$		$F(7) = 3.87$, $p < .001$	

Note.: *m* = mean; *SD* = standard deviation; statistics followed by asterisks demote values that are significantly different from italicised values.

7.1.1.2 Bushfire preparedness – Families' preparedness

Residents whose family members were prepared for bushfire were significantly more likely to prepare than residents whose family members did not prepare (or indicated they did not know if they were prepared), $F(3) = 6.96$, $p < .001$ (Table 12). This supports the fundamental influence of residents' social environment, and especially their close referents' ability to influence the resident's own decisions to prepare. This suggests the existence of a social transmission of preparedness again highlighting the necessity of targeting social and community variables (e.g., sense of community, community involvement) when developing community bushfire education programs.

Table 12

One-way Analysis of Variance between Others' and Own Bushfire Preparedness

Bushfire preparedness	(n)	*m*	*SD*	*F*	*p* <
Resident's Family	Yes (80)	3.75	2.52		
	Don't know (46)	2.59	2.02		
	No (24)	1.63	2.20	6.96	.001
	Not applicable (25)				

A significant difference was also found between friends' level of preparedness and residents' own level of preparedness, $F(4) = 2.69$, $p < .05$, however, post-hoc analysis indicated no significant between group differences.

Extracts from the Questionnaire (Table 14) provide qualitative support for this social transmission of preparedness that seems to exist, in particular between residents and other family members. However, as denoted by 'Well Prepared

Example 1', this may reflect a bias in the way the question was asked (i.e., "Are your other family members prepared for a bushfire?" Answer: "Yes, as above").

The question elucidating residents' other family members' level of preparedness may have been biased in that residents inferred this question to mean other residents living with them. If the respondent themselves was prepared, or indicated that they were prepared, it would also be very likely that they would indicate and assume others living in the same household to also be prepared. This would therefore not provide a very accurate indication of whether other relations, not living with the resident, also prepared for bushfire.

This assumption however, may represent an important household bias if residents assumed that other household members know what the household bushfire plan is or, what their significant other intends to do in the event of a bushfire. This finding suggests a potential familial bias similar to unrealistic optimism (see section 2.6.1.1). Exploration of this phenomenon therefore calls for more in-depth analysis; such that can only be achieved by conducting qualitative analysis, and which is subsequently presented in the following chapter, Chapter Eight. This particular issue is covered in section 8.3.2.3.

7.1.1.3 Bushfire experience – Bushfire preparedness

Whether residents had previously experienced bushfires was also found to significantly influence bushfire preparedness, $F(1) = 13.47$, $p < .001$, with residents who had previously experienced bushfires (n = 100; $m = 3.67$, $SD = 2.30$) indicating having adopted significantly more bushfire preparedness measures than residents who did not have previous experience (n = 79; $m = 2.42$, $SD = 2.23$, range 0-9). Furthermore, residents whose friends' or family members had bushfire experience

indicated being more bushfire prepared than residents whose family or friends had not experienced bushfires (see Table 13). This finding therefore provides evidence of social transmission (whereby people learn from imitating and emulating others; e.g., Acerbi, Tennie, & Nunn, 2011) and supports the study's premise of the fundamental importance of people's social environment in influencing the adoption of bushfire preparedness behaviour.

Providing further evidence of the fundamental role of social transmission was the finding that residents' whose friends had previous experience with bushfires were significantly more likely be prepared for bushfires than if their friends had not had previous experience, or if they did not know if their friends had previous experience. Similarly, if other family members had previously experienced bushfire, residents were themselves more likely to have adopted preparedness measures compared to those residents whose family had not prepared, or they did not know if they had prepared (Table 13, SPSS output presented in Appendix P).

These findings suggest that not only does previous bushfire experience increase the likelihood that a resident will prepare for bushfires, but also that if the resident's family and/or friends have experienced bushfires, regardless of whether the residents have experience a bushfire themselves (vicarious experience/social construction of risk), they will be more likely to prepare,

Table 13

One-way Analysis of Variance between Bushfire Experience and Bushfire Preparedness

Bushfire experience	(n)	*m*	*SD*	*F*	*p* <
Resident	Yes (100)	3.67	2.30		
	No (79)	2.42	2.23	13.47	.001
Resident's Family	Yes (73)	3.78	2.36		
	Don't know (15)	1.73	1.39		
	No (88)	2.73	2.22	6.50*	.05
Resident's Friends	Yes (96)	3.74	2.40		
	Don't know (48)	2.29	2.01		
	No (35)	2.54	2.34	7.99	.001

Note.: *As Levene's test for homogeneity of variance was breached, Welsch's *F* is reported instead.

'Well Prepared Example 2' in Table 14 illustrates the responses of a very prepared resident who, although did not have previous experience themselves, other friends, family members, and community residents had. This may reflect an increased critical awareness of the resident, which reflects the frequency with which people discuss and think about bushfire issues (Paton, Bürgelt, et al., 2008), as a result of interacting with important referents who have experienced a bushfire (McIvor & Paton, 2007). This therefore provides further support for the fundamental role of residents' social environment in influencing their interpretation of and thus subsequent action towards bushfire risk.

Table 14

Example Questionnaire Responses Highlighting Resident Preparedness in Relation to their Friends'/Family's Preparedness and Previous Experience

Example Responses from Questionnaire	Have you made any structural changes to you house to make it more bushfire safe?	Do you have any fire fighting equipment?	Do you have any personal bushfire protective clothing?	Are you prepared for a bushfire event in your area?	Are your other family members prepared for a bushfire?	Have you experienced a bushfire?	Have any of your friends experienced bushfires?	Have other members of your family experienced bushfires?	Have other members of your community experienced bushfires?
Well Prepared Example 1	Yes	Yes - pump, dam, backpacks, fire ex, tanks	Yes - woollen trousers, tops, jacket, boots	Yes – water tanks full, dam, pump serviced	Yes - as above	Yes - 1994 fire started in Margate, lost shed	Yes - lost house, Snug Falls Rd	Yes - Both daughters have stayed & fought fires	Yes - friends and neighbours
Well Prepared Example 2	Yes - sprinklers on roof, wool insulation in eaves/gaps, cement board beneath sections of cedar boards, interior bushfire shelter, huge dam	Yes - 2 petrol pumps plus underground pipes around house so can pump and spray from 3 points	Yes - wool trousers and shirts, gloves, boots, blankets	Yes - almost - once bunker finished	Yes	No	Yes - brother-in-law at Bonnet Hill 1998	Yes - Husband helped in above fire	Yes - many here in '67
Poorly Prepared Example 1	No	No	No	No - don't know if enough area around house is	Yes - planning to leave early	No	Yes - as a child she had to hide under the house in Melbourne	No	Don't Know
Poorly Prepared Example 2	Yes - we built to be safe as we could	No - intend to purchase pump clothing etc. very soon	No - intend to purchase very soon	No	No	No	Don't Know	Don't Know	Yes

7.1.1.4 Gender – Preparedness

Women (n = 74; *m* = 2.66, *SD* = 2.29) were found to be significantly less prepared for bushfire than men (*n* = 104; *m* = 3.46, *SD* = 2.34), $F(1) = 5.14$, $p < .05$ (see Appendix P for output). Furthermore, upon being asked whether they intended to leave early in the event of a bushfire in their area, female residents (*m* = 1.81, *SD* = .77) indicated being significantly more likely to intend to leave early compared to male residents (*m* = 2.16, *SD* = .78), $F(1) = 8.96$, $p < .01$). A related and significant but not predicted finding, was that residents who indicated they were going to leave early (*n* = 56; *m* = 2.04, *SD* = 1.95) were significantly less prepared (range from 0-9) than residents who indicated 'no' (n = 57; m = 4.33, *SD* = 1.90), they did not intend to leave early, $F(1) = 16.16$, $p < .001$. Residents who indicated that 'maybe' (n = 67; m = 2.97, *SD* = 2.51) they would leave early were also significantly less prepared than residents who intended to stay and defend.

A related finding was that women (*m* = .79, *SD* = .99) had attended significantly fewer community bushfire education events than men (*m* = 1.25, *SD* = .97), $F(1) = 9.30$, $p < .01$. This is consistent with other research which has found that women are less likely to attend formal emergency organised events (e.g., State Emergency Service, volunteer fire brigade etc.) and rather tend to participate in local grass roots associations (Enarson, 1998).

7.2 Discussion

7.2.1 Localities and preparedness

The finding that the communities targeted in the present study differed significantly in their level of and intention to prepare for bushfires, suggests that not only do these communities' capacity to respond and recover from bushfires vary, but

as the Model illustrates in Chapter Six (Figure 6), the social variables promoting the adoption of bushfire preparedness must also differ between these communities. This highlights the need to consider each community on a case by case basis and reiterates the fact that a one-size-fits-all community education program cannot be applied to every community at risk of bushfire.

7.2.2 Previous experience and preparedness

The analysis of variance (Table 13) showed that residents who had themselves had previous experience with bushfires were more likely to be prepared for bushfires than those residents who had not had direct experience. Furthermore, residents whose family and/or friends had experience with bushfires were also significantly more likely to be prepared for bushfires than those residents' whose family and/or friends had not experienced bushfire. This was further illustrated by the Bushfire Preparedness Questionnaire responses provided in Table 14.

The finding that direct experience influences preparing for bushfires is supported by previous research (e.g., Gow, Pritchard, & Chant, 2008; Nicolopoulos & Hansen, 2009). Morrissey and Reser (2007), in their paper on the effect of natural disasters in rural Australia, suggest that the effect of previous experience on preparedness is conditional and depends on the experience. They suggested that only if an individual has had a positive experience (coped reasonably well) would this knowledge benefit them for future hazard events. This positive prior experience establishes realistic expectations and promotes self-efficacy and confidence in coping with future disasters. Alternatively, if an individual's prior hazard experience was negative, it is likely that anticipatory anxiety and dread will diminish psychological and practical preparedness for future natural hazard events. Since the bushfires that have occurred in Tasmania in the last 20 years have not resulted in any

fatalities or major property loss, it could be argued that most residents' previous Tasmanian bushfire experience was relatively benign.

The finding that vicarious experience also influenced residents' bushfire preparedness, is consistent with the understanding that whether people perceive an issue to be salient, and their perception of potential risks and how to confront them, is largely influenced by the views of others (social transmission); others who share similar values such as friends and family (McIvor & Paton, 2007). Similarly, earthquake research by Mileti and Fitzpatrick (1992) and Mileti and Darlington (1997) found that respondents' own preparedness for earthquakes was significantly correlated with the observation of other people adopting earthquake adjustments (Lindell & Perry, 2000). This provides support for the Model findings and supposition that bushfire risk is to a large extent socially constructed and that residents' interpretation of bushfire information and how to act on it, is greatly influenced by their social environment. As such, in order to develop more effective community bushfire education strategies, agencies must acknowledge the influential capacity of community variables (e.g., sense of community, community involvement) and ensure these are incorporated into future programs.

As major bushfires are relatively infrequent occurring events in Tasmania, the likelihood of residents having previous experience with bushfire hazards is assumedly quite low. The inherent issue therefore becomes encouraging residents who have had no previous experience to take action against a threat they are unfamiliar with. This highlights the problem of fire agencies advocating property owners to stay and defend if they are 'capable and prepared' even though most recipients of this message have no or little experience with bushfires with which to

interpret the physical and psychological levels of preparedness this message implies (Gill, 2005).

Although previous experience was not controlled for in the present study, target communities were selected due to their recognised bushfire risk (Tasmania Fire Service consultation). These communities however, had not directly experienced a major bushfire in the last 10 years (the Ridgeway fires of 1998 were the last major bushfire effecting one of the target communities) and yet still over half of the residents (55.32%, 104 out of 188) indicating having had previous experience with bushfire. This may either reflect the relatively long standing residency of many of these community members (average time in home 12.90 years, average residency in community 15.53; see Table 8) and thus their experience with major bushfires over the years or since they were asked 'have you experienced a bushfire', may be including in their experience smaller, non-life threatening bushfires (e.g., property burns-offs, planned burns by agencies). Unless the residents' perception of the experience of the fire is understood (e.g., traumatic or positive experience), a clear understanding of how previous bushfire experience influences preparedness adoption cannot be obtained. As such, it is recommended that future use of this measure should re-word the question to 'have you experienced a major bushfire?' or define being affected by bushfire as constituting evacuating, defending, or experiencing loss of personal or local property.

Another reason for this relatively high proportion of residents indicating past bushfire experience (relative to the above discussed infrequent occurrence of major bushfires in Tasmania) may be due to Tasmania's comparatively small geographic size and thus the ripple effect (both physically and emotionally) of major bushfires on neighbouring communities. For example, although Binalong Bay has not

experienced a major bushfire in more than 15 years, the East Coast fires of 2004 (see Figure 1) had a profound effect on its residents (as will be discussed in Chapter 8). This was due not only to the close physical proximity of these communities (e.g., only 40 kilometres between Binalong Bay and Scamander) but also the relative closeness residents on the East Coast may feel due to a shared sense of identity (e.g., appreciation of seaside environment, lifestyle choice). Furthermore, many residents who have holiday homes or shacks at Binalong Bay have primary residences in places like St Mary's and Scamander which were affected by these fires (see Figure 1 for map). Consequently, future research especially in relatively small geographic locations like Tasmania need to consider the complexity of what is entailed by 'previous experience' and the inevitability of vicarious experience (because Tasmania has a relatively small population, the degrees of separation are not that vast between people, so bound to know someone who has experienced major bushfire).

7.2.3 Others' bushfire preparedness and own preparedness

The finding that if a resident's other family members prepare for bushfire, they themselves are more likely to be prepared for bushfire supports the notion of subjective norms influencing behavioural choices (Doll & Ajzen, 1992). Subjective norms reflect people's beliefs concerning the social expectations of significant others (e.g., parents, spouses) (McIvor & Paton, 2007). As such, if other family members believe in the efficacy of adopting bushfire protective measures (and thus adopt them), the individual is also likely to adopt the behaviour as they will perceive their significant others to approve of this behaviour.

The finding that friends' level of bushfire preparedness did not influence residents' own preparedness adoption questions the extent to which these subjective

norms influence residents' level of preparedness. The response bias that may have potentially influenced the question regarding other family members' preparedness further adds to the necessity to explore the role of significant others' preparedness on residents' own preparedness in future research. The assumption that all members of the household are equally prepared or share the same plan regarding bushfires is an important issue highlighted by this unintentional potential bias. To understand this assumption better more in-depth analysis is required. This was achieved through the analysis of qualitative data presented in the following chapter (Chapter 8).

7.2.4 Gender, 'leaving early', and preparedness

The finding that women were significantly less prepared for bushfire than men, and that they were more likely than men to leave early in the event of a bushfire, suggests that women do not consider leaving early as requiring much planning or preparation. Furthermore, a majority of participants who indicated that their plan was to leave early had not engaged in any activities to mitigate the bushfire risk to their property. This is of particular concern considering that fire service authorities instruct that residents who intend to 'leave early' (e.g., have everything packed and ready to go) also need to prepare to 'stay and defend' in the event that those residents cannot leave early or a warning is not received in time. This finding questions the current format and emphasis on informing residents of how to prepare if intending to leave early.

These finding support work by other researchers (e.g., Enarson, 1998; Eriksen et al., 2010; Morrow, 1999) who suggest that due to the relative gendered division of labour within the household, with women's domestic duties traditionally being centred more within the home and men's domestic duties more outside the home (Fothergill, 1998), men more often perform what is commonly seen as the

‘customary’ bushfire preparedness activities such as clearing of bush, slashing grass, burning off, cleaning gutters, and maintaining and ‘manning’ fire pumps. The fact that these tools and actions are seen as the ‘customary’ bushfire preparedness activities reflects the masculine culture of the fire brigade.

The relatively limited emphasis (until recently) on planning and preparedness measures that do not involve physical activities (e.g., having a plan of where to go, emergency kit, copies of important documents), and which are more in line with traditional female roles, further supports this traditional paternal culture. Therefore, women are commonly less competent in these tasks because they have had less experience with them, and thus rely on the men in the household carrying out these mitigation behaviours. Furthermore, these activities are also traditionally associated with the ‘stay and defend’ bushfire plan which supports the findings shown in section 7.1.1.4 that women are less likely to adopt preparedness measures and less likely to stay and defend.

As well as suggesting that adoption of these ‘customary’ bushfire preparedness measures represent a shift from traditional gender norms, the fact that women are still more inclined to leave early but do not prepare to do so, suggests that the current forms of bushfire preparedness education are not effectively targeting women.

Bushfire education is usually provided in the form of passive literature distributed to households or at the community level, through information sessions held at the local community hall or school. Previous research has found that women are less likely to be involved in formal emergency organisations (e.g., State Emergency Service, volunteer fire brigade etc.) and rather tend to participate in local

grass roots associations (Enarson, 1998). It has been suggested that this reflects an extension of their traditional gender roles and responsibilities as the primary caregivers and household organisers, a role that is extended to the wider community (Morrow & Enarson, 1996). The finding of the present study that women are less likely to attend community bushfire education sessions supports this view and suggests that in order to increase women's levels of preparedness, the way they engage with the information needs to be reviewed. As such, providing an opportunity for women to obtain bushfire risk and preparedness knowledge at the community 'grass roots' level, may be a more effective way of achieving this goal. This very approach has been trialled by some fire agencies (e.g., the South Australia Country Fire Service's 'Fiery Women') and was piloted as part of the present study's action research (see Chapter 10).

The individual and community differences, determined through the means of univariate analysis, presented in this chapter highlight the complexity of promoting bushfire preparedness, the diversity of and within communities, and warn against adopting a 'one-size-fits-all' approach to community bushfire education programs. Although the Model presented in Chapter Six (Figure 6) provides a generic account of what individual, social, and agency factors promote bushfire preparedness, the results presented in this chapter emphasise the need to approach each community on a case-by-case basis when engaging them in community bushfire preparedness programs. The univariate analysis conducted to determine significant differences between the communities and sub-samples of the community (e.g., gender, previous experience) do not however, provide an explanation of why these differences occur.

Furthermore, significant issues highlighted by the analyses in this chapter, including the influence of significant others (e.g., family, friends, neighbours) on

residents' decision to prepare or not for bushfires, the assumption that all members of a household are equally prepared or share the same bushfire plan, and finding that women do not believe leaving early requires preparing and disengage from traditional formats of bushfire education, require further exploration. All three of these findings emphasise the critical influence of residents' social environment and support the notion that unless future community bushfire education programs accounts for this, their efforts will be in vein.

Therefore, a deeper understanding and exploration of the social environment that holds such persuasive influence of residents' bushfire preparedness decision making is needed. As such, qualitative data obtained from telephone interviews with a sample of residents from the four target areas were collected to, a) validate the Social Attachment Model of Bushfire Preparedness and offer a more in-depth understanding of the included variables and relationships, b) provide a deeper understanding of the individual and community differences determined in this chapter, and c) identify and explore other important themes which may allow a more comprehensive understanding of what influences people's decisions to prepare, or not prepare, for bushfires. The following chapter thus presents the qualitative data component of the study.

Chapter Eight - Exploring the Factors that Promote Bushfire Preparedness

8.1 Introduction

Although structural equation modeling and individual comparison of community factors through multivariate analysis can determine directionality and weighting of factors contributing to 'preparedness', it does not allow interpretation of why or how residents attribute importance to these factors. Therefore, to provide more detailed information regarding what specific aspects of the social environment influences preparedness activities, telephone interviews were conducted with a sample of the residents.

8.2 Method

8.2.1 Recruitment

Participants were recruited from community bushfire information sessions held by the Tasmania Fire Service or local community Fireguard group before or during the bushfire season of 2009/10. These information sessions are held annually as part of the Tasmania Fire Service's (TFS) community education campaign before the commencement of the bushfire season. Events are typically advertised in the local newspaper, radio station, and/or local television station. In total, 34 participants were recruited. Four of these participants represented couples from two different households. This inclusion is based on the recognition that even within households; people have very different interpretations and beliefs about bushfire risk and preparedness (Eriksen et al., 2010); an issue alluded to in Chapter Six. Table 15 provides the number of participants recruited from each location.

Table 15

Number of Participants Recruited from Each Event and Area of Residence

Residential Area	Event participants were recruited from	No. Recruited
Bagdad	TFS Community Awareness Forum, Bagdad Hall	4
Binalong Bay	TFS Community Awareness Forum, Binalong Bay Fire Station	6
Fern Tree	TFS Community Awareness Forum, Fern Tree Hall	8
Kettering	Fireguard Community Meeting, Kettering Hall	6
Middleton	Fireguard Community Meeting, Middleton Hall	6
Snug	TFS Community Awareness Forum, Snug Hall	5
	Total	35

At the conclusion of each of the events, the researcher gave a brief presentation outlining the research and what was involved in participating. Interested community members then read and signed a consent form providing their telephone number, most suitable time to call, and whether they consented to having their interview digitally recorded (see Appendices B and C for information sheet and consent form). Interviews were conducted between October, 2009 and February 2010, during the time that people should be thinking about bushfires and their bushfire plans. Table 16 below provides a summary of when these interviews were conducted, the duration range, and average telephone interview duration for each month.

Table 16

Telephone Interview Number and Duration per Month during 2009/10 Bushfire Season

Month	No. of interviews	Interview duration range	Mean interview duration
October, 2009	7	19.86 – 47.28	32.94
November, 2009	7	23.11 – 72.28	45.94
December, 2009	9	25.05 – 80.53	46.71
January, 2010	10	21.71 – 62.02	41.82
February, 2010	2	22.41 - 43.36	32.89
Total	35	19.86 – 80.55	41.61

8.2.2 Interview procedure

A semi-structured interview approach was used to elicit responses from participants in regard to their perception of their bushfire risk, their physical and psychological preparedness, prompts for preparing for bushfires; influential factors, roles and responsibilities, and involvement in bushfire preparedness community initiatives (see Appendix D for interview schedule).

Interviews were semi-structured in the sense that questions were not asked in a fixed order but rather incorporated into the conversation so as to allow the interview to proceed as smoothly as possible, and take the form of a relaxed conversation rather than a formal interview. This way, participants more eagerly answered questions and felt comfortable expanding on the questions asked and offered information and examples that they felt were salient to the issue. Participants were also assured that they would remain anonymous in the process and that any individuals (e.g., neighbours, fire brigade chief) that they may have referred to in the interview would be provided with synonyms also during the transcribing process.

Each interview was audio recorded and transcribed verbatim into plain-text Word documents before being coded and analysed using the Computer Assisted Qualitative Data Analysis Software NVivo 8. A more detailed account of the methodology employed for this qualitative component of the study is provided in Chapter Four.

8.3 Results of Interview Data

The mixed-methods approach adopted by this study allowed for the triangulation of results of both quantitative and qualitative method and data. Thematic analysis was used as a research tool to extract the key themes and issues from the qualitative data. As thematic analysis draws on techniques also employed in grounded theory its use ensured that themes and concepts were derived from the data itself and not from prior assumptions or theories. However, it was anticipated that triangulation of both qualitative and quantitative data would emerge to support and validate the variables and relationships presented in the Social Attachment Model of Bushfire Preparedness. As such, the following results section will be presented in three parts; the individual/cognitive factors, the community factors, and the societal/agency factors that influence people's adoption of bushfire preparedness measures. These three levels therefore correspond with the individual, community, and societal factors that were identified in the Model (Figure 6), demonstrating in a more sequential way the triangulation of data. The community and sub-group differences presented in the preceding chapter will also be addressed in the following sections.

8.3.1 Individual/cognitive factors influencing preparedness

8.3.1.1 Attachment to place

As elucidated by the Model (Figure 6), residents' attachment to place is an influential predictor of both people's relationship with the wider community and their beliefs about the efficacy of adopting bushfire mitigating behaviour.

Telephone interviews with residents revealed that one of the main reasons for moving to the area they now lived was their attraction to the natural environment in and around their locality. When asked during telephone interviews why they lived where they lived, half of the residents (n = 17) suggested that the environment (including nearness to the sea and or bush) was the main contributing factor. Twelve of the interviewed residents indicated that having land and being in a country setting was the main reason for living where they did, and nine suggested that it was the lifestyle that the area provided that swayed their decision. Only seven residents included in their answer to why they had decided to live in their particular area reference to affordability of land or proximity to amenities.

These findings from the interview data thus provide further support for the motivational role of place attachment identified by the Model (Figure 6) and reiterates the added complexity this provides (i.e., people choose to live in environments that provide the risk) to promoting bushfire preparedness (see section 2.6.3.2). These data also suggest that place attachment differs between areas depending on the environmental attributes the particular area boasts. For example, five out of the six participants from Binalong Bay and five out of the eight participants from Fern Tree suggested that the environment was the main reason for moving to the area. Participants from Fern Tree for example suggested that the

attraction to Fern Tree was its nearness to ‘the Mountain’ (Mount Wellington) and this being a place of intrigue. Binalong Bay residents indicated that the attraction to living in the area was attributed to its environmental and aesthetic attributes; the nearness of the water, the bush reserves, and the amiable climate.

> ...like when I was a kid I grew up just down the road above Cascades and umm like [Fern Tree] was always where the snow was so (laughs) so it’s always been that magical place so always sort of on the way to the mountain so always had that sort of mystic... (Cam from Fern Tree)

> ...err, why did we move? We looked everywhere for 18 months and decided Binalong Bay was the best place in Tassie, which is the best place in Australia, which is the best place in the world, it’s warmer, it’s sunnier, it’s relaxed, ermm that’s good, err beaches, lifestyle... (Sam and Esther from Binalong Bay)

The lack of an attachment to place has implications for subsequent protection behaviour. Two of the four residents from Bagdad for example explained that ‘cheap land’ was their main reason for moving to the area. One resident, Peter, indicated that he moved to Bagdad under ‘rough’ financial circumstances and had to move out of a house in Hobart he was very much attached to. Consequently, his attachment to place was somewhat loose, suggesting that the reason he moved to Bagdad was because “the land was cheap”. Peter remembers his first night in his new home in Bagdad;

> …well I had plans of a nice house but that never happened, erm so I started off with a 6 metre by 10 metre shed, a concrete floor and a Colourbond roof and walls and, and then I brought my stuff out here and I spent the coldest winter of my flaming life and I’m think ‘oh my god what have I done! (Peter from Bagdad)

Peter further suggests that he cannot afford to prepare for bushfire nor pay for house insurance, but yet he stated that he had recently returned from a month on mainland Australia after participating in a vintage car rally. The above extract therefore highlights Peter's lack of attachment to place, and subsequent lack of motivation to prepare for bushfire. This provides support for the Model's (Figure 6) finding that attachment to place is an important factor in the bushfire preparedness decision making process.

Furthermore, many residents indicated that they were aware of the bushfire risk when they moved to the area, "but didn't stop us" (e.g., Graham from Binalong Bay) and others "knew that it was something that we aspired to want, you know, to work towards management of" (Cam from Fern Tree). Therefore, regardless of being aware of the potential bushfire risk, residents' desire to live in an area because of their high attachment and value judgements towards it outweighed the potential risk they felt of residing in the area. This attachment to the physical environment may be attributed to the interpretive bias, known as risk compensation (tendency for people to overestimate the capacity of their environment/measures adopted to reduce the perceived threat) that was also evident and is further discussed in section 8.3.1.4. In other words, although residents were aware of the bushfire risk when they moved to the area, their desire to live in that particular (hazardous) environment led them to justify or down-play the risk, or overestimate the ability of preparedness measures and their physical environment (e.g., creek bed offers protection, trees catch embers) to mitigate the threat.

Additionally, due to this attachment to place, especially owing to environmental attributes, interviewees from Binalong Bay in particular suggested that it was really difficult getting this 'balance' right between reducing bushfire risk

but maintain the environmental landscape to which they are so attached and the main reason they moved to the area. This 'balance' then, can act as a barrier for people adopting preparedness measures (e.g., clearing, burning off). Table 17 provides residents' expressions of such views.

Table 17

Balance between Environmental Preservation and Bushfire Risk Reduction

...but I'm I suppose I'm a greeny and a conservationist that we've denuded the country side enough [yeah] without going down this bloody umm at all expense just clear the land so we don't have a fire you know, I can't, we have really wrecked this state argh with land clearing you know on in some areas and we're still doing it... (Garry from Binalong Bay)
...I mean I'm a greeny and I prefer not to chop any trees down but I've had to come to the realisation, quite a hard one, but that, you know, the tree trees are a fire risk in terms of your house... (James from Binalong Bay)
...I mean it's a compromise, a bit of a tight-rope thing cause you know it's a balance between aesthetics and err safety I think... (Jeremy from Binalong Bay)
...we've cleared a lot more bush around our house than we envisaged when we, you know, first came up with the dream of living here (yep, ok) when we first came here we were very protective of our bush and we moved in September and then the Scamander bushfires went through in sort of December so that was a fairly timely wake up call for us... (Tony from Binalong Bay)

As such, it seems that for some residents, the cost of severing their connectedness with nature and sacrificing aesthetics, greatly outweighs the potential benefits of mitigating bushfire risk (McFarlane et al., 2011; Paton, Bürgelt, et al., 2008). Individuals often define their place attachment by the natural or vegetative features of their surrounding environments, with benefits such as providing a sense of 'naturalness', privacy, conserving energy, providing wind breaks, attracting

wildlife, and contributing to the aesthetics of the property, adding to the overall bond a resident feels with surrounding environment.

In their study of community bushfire preparedness in Colorado, Brenkert-Smith, Champ, and Flores (2006) reported residents' feeling that recommended preparedness measures (e.g., clearing trees, reducing undergrowth) were inflexible prescriptions that threatened the aesthetic qualities of their property. As such, residents may perceive mitigation as competing with highly valued environmental attributes, resulting in a trade-off between the cost of altering desired landscape features and the benefit of reducing a potential bushfire hazard (Brenkert-Smith et al., 2006; McFarlane et al., 2011).

As a result of this environmental appreciation and perception of mitigation measures being inflexible, people may be unwilling to listen to the Tasmania Fire Service in the first place because they believe becoming prepared requires 'cutting all the trees down, laying concrete and painting it green'. As such, to ensure people do not disengage from the bushfire preparedness message from the outset, it is vital that fire agencies provide advice that not only appears to offer a compromise (e.g., trees in certain conditions can actually protect property from embers) but delivered in a manner that is not authoritarian or depicting blame. This further highlights the importance of relationships between communities and fire agencies being built on trust and effective communication strategies employed. This issue will be explored in detail in Chapter Nine and Chapter Twelve.

The above findings suggest that attachment to place or environment may act as an inhibitor of people preparing for bushfires (at least with regard to some preparedness measures such as those that modify the natural environment; e.g.,

clearing undergrowth, removing trees). A corollary of this is a need to explore how attachment (to the natural environment – mediated by where one decides to live) would influence people to adopt preparedness measures. Some ideas as to why emerged from the interviews.

When prompted further many residents, who expressed an attachment for the area they lived in, suggested that the reason they prepared was because they valued where they lived and that the house they lived in allowed them to enjoy the area and its natural beauty, and therefore they did not want to lose their house. Consequently, these residents were more inclined to support the structural preparedness measures recommended but not those that affected the natural environment (Paton et al., 2008). A sense of 'attachment to house' therefore adds a further dimension to place attachment that was not elicited by the Model. Table 18 provides extracts from interviewees providing examples of how their attachment to their house/home was the driving motivation for them preparing for bushfires.

Table 18

Individual Factors Promoting Bushfire Preparedness - Attachment to House

...well perhaps the fact that I err built the home and love my house and err property makes me really want to protect that, I guess if I was renting somebody's little brick veneer, you know, boring place I'd probably walk away (Brian from Kettering)
…I'm pretty attached to my house...I built it you know, myself with help and it's sort of a culmination of a lifelong dream and to me it not just you know a house I went and bought or something...I made all the mud bricks and you know I did it from the ground (Maggie from Middleton)
...I think we're pretty in love with the place where we live...yes Snug's great love Snug, but the actual property, we have a lot of passion for this property, the house itself is a really unique property and it's not something you recreate easily so with that in mind I'd like to know if a fire came through that I'd done, we'd done everything we could to give it the best possible chance...rather than live with the regret that I probably wasn't that well prepared (Merv from Snug)
...we don't want to do it again (laughs) [build house] I think it comes down to that really, we're quite happily settled here, we certainly don't want to have to move or do it all again and we'd rather put in precautionary steps than have to do that, so no we're quite happy with what we've got (Phoebe from Snug)
…I spose I value the house we live in and what we've got here yeah... it was the dream house sort of thing, yeah , we put a lot of time and effort into its design and it's got unique features (Tony from Binalong Bay)
...we want to save our property...we've put an awful lot into it over 20 years (laughs) we've built everything we've got on it and, yeah we don't want it to go up, if we can avoid it (Prue from Kettering)
...well I guess we actually value our umm position here and our property and having done most of the building ourselves, we don't want it in fact burn down, having wasted all our lives for nothing, so it's an extra insurance policy but one that we won't have to cash in (Kevin from Kettering)

The comments from residents in Table 18 suggest also that home builders, or individuals who have such an attachment to a place that they decide to invest considerable time, money, and effort into building their home on the peri-urban fringe thus optimising their connection with the place, attribute a greater sense of meaning to their home and the environment in which it resides and thus act to protect this asset. However, analysis of the questionnaire data found no significant difference between home builders and 'buyers' on the measure of preparedness, nor was any difference found on the measure of attachment to place. Whether building a home prompts individuals to protect it from bushfires or provides the individual with the skills and awareness of structural vulnerability (e.g., to fires – so more building/fire aware), or whether certain personalities are drawn to building their own homes, and these personalities are more susceptible to adopting preparedness measures remains to be found and provides a future research direction.

Balance – Attachment to house versus managing bushfire risk. Similar to the balance between environment preservation and bushfire hazard reduction, residents' strong feelings towards their homes, their 'love' of their properties, especially home builders, can result in residents feeling the need to balance maintaining the features they value in their house with making it bushfire safe. This decision is not aided by the relative infrequency of bushfires, or probably more accurately, residents' limited experience with bushfire (especially if they are tree-changes or have recently moved to the popular peri-urban interface).

> ...people aren't going to rebuild their houses for the sake of a maybe bushfire... (Mary from Woodbridge)
>
> ...it's a bit of a hippy house really, but you know that's its history I guess, it was built in the days when we tried to be a bit self-sufficient and so on, so to make it fire safe we would really have to pull it down... (Ruby from Bagdad)

To overcome this cognitive dissonance, this balancing act of preserving valued attributes such as the environment or property features with bushfire safety, has led to some very interesting coping mechanism. For example, Cam from Fern Tree was very hesitant at first to remove vegetation and certain valued trees in his backyard, but realised it was necessary in order to reduce his bushfire risk. His attachment to the vegetation was almost humanised as he explained that if he had to cut the trees down, he wanted to do it 'fairly' using a handsaw and not a chainsaw. Cam explained that by cutting the tree down by hand, the necessary expended energy required by him made removing the tree more equitable.

> ...I'm pretty happy not to use the chainsaw actually, I don't (laughs) it's one of those big scary things that I think 'oh' I'm not, I'm probably not suited to be a chainsaw operator (laughs) and I like the fact that I...I've got a kind of a purist sense about, you know, I cut that down by hand like I like that... (Cam from Fern Tree)

Garry overcame his environment/bushfire risk balance dilemma by installing a sprinkler system on his house. Garry, a horticulturist by trade confessed that his six acre property is very rich with vegetation, but due to his previous experience in the 2004 East Coast bushfires, believed that his sprinkler system will wet and protect the whole property. The fact that his property only suffered relatively minor damage during the bushfire acts as positive reinforcement of Garry's belief that his sprinkler system is not only adequate, but 'saved his property'. This is evidence of normalisation bias, which will be further discussed in section 8.3.1.4.

> …with the sprinkler I put in, it's a matter of just connecting the petrol pump, and then...into the two inch pipe and then up to a big brass knocker sprinkler so that just wets the whole property…I put one in weeks before the Scamander fires here which helped save my property cause 3 or 4 of my neighbours all got burnt down…everyone should have one…

> …we've seen an incredible deforestation of the environment around Scamander because of the effect of the fires…I've got a 6 acre block, my block is now surrounded by mowed bushland, my block is regenerated back thicker than ever, because of my botanical interest and the species I have on my acreage, it's very rich…and you'd love to see my huge big white gums that just tower above my house, because people freak, they see these huge big white gums and say 'how in the hell didn't your house go with those there?'… (Garry from Binalong Bay)

As such, Garry justifies his densely vegetated block, and the potential bushfire risk it poses, by the protection he feels his sprinkler system provides. The positive reinforcement of this belief by his relatively positive recent bushfire experience further cements his confidence in the balance he has struck.

Dual purpose. This sense of balance that people have to manage when making decision about whether to adopt bushfire reduction measures is also reflected in the finding that people are more eager/likely to adopt these measures if they serve a purpose other than/in addition to reducing bushfire risk. For example, James from Binalong, a self-proclaimed 'greeny', explained he had 'employed a method' for deciding which trees to cut down, rationalising that if the tree was close enough to fall on his house during a storm, then it had to come out. Carmen from Middleton explained that their sprinkler system was also installed to act as a garden irrigation system, and Clint from Bagdad in a follow-up interview explained that;

> …the only thing purchased now [since first interview] is a generator just to give us a bit of normal domestic electricity for things, that's sort of a double edged influence for something else…

This finding has implications for risk communication in that if additional benefits of buying a fire fighting pump (e.g., filling up livestock troughs), generator (e.g., back-up electricity in black-out prone areas), or simply having an emergency

'leave early' kit ready (e.g., for other hazards such as storm, flood, terrorism, or emergency hospital admission), these measures are more likely to be adopted by residents who as a result weigh the benefits in favour of the costs. As such, adoption of these 'dual purpose' measures will be seen to have short term benefits or reinforcement of behaviour, rather than waiting for future (if and when) bushfire events to justify preparations.

8.3.1.2 Responsibility

The Model presented in Chapter Six (Figure 6) supported the important role of responsibility in predicting the development of intentions to prepare and subsequent adoption of preparedness measures. During the telephone interviews, the 34 participants were asked 'whose responsibility is it to ensure that community members are prepared for bushfire?' Thirty two of the 34 participants indicated that it was the homeowner's own personal responsibility to ensure they were prepared. Participants suggested that this was because they themselves had made the decision to live in a bush environment, or that they realised that the volunteer fire brigade had limited resources to be able to provide assistance in a major bushfire (see section 10.1 for further discussion). The other two residents suggested that although they believed the individual homeowners to be ultimately responsible for preparing themselves, they believed that the Tasmania Fire Service and volunteer fire brigade had a role in providing the information and increasing the awareness of bushfire risk through education. It was also suggested that Councils, Parks and Wildlife, and Forestry all had a part to play in reducing the bushfire risk on their properties. Only two participants suggested that it was the fire agencies (i.e., Tasmania Fire Service) and/or local government that were solely responsible for ensuring communities

preparedness (Ivy and Denis). Interestingly, neither of these two participants indicated having engaged in significant bushfire preparedness activities.

This reiterates the findings of the earthquake preparedness research of Mulilis and Duval (1995) and Lindell and Whitney (2000). These authors found that attributing responsibility for personal safety to others, or externalising blame, resulted in a reduction of hazard adjustment adoption. As telephone interview participants were recruited from community bushfire education information sessions, these results could reflect a sample bias. In other words, these residents attending a public information session could reflect their inherent belief that it was their responsibility to prepare and thus obtain relevant information so to be able to achieve this.

Interestingly, where ‘individual responsibility’ was found to predict intentions to prepare in the Model (Figure 6), and subsequently supported by the telephone interview data, feeling ‘responsibility for the safety of others’ was indicated by participants as a reason for actually preparing. Table 19 provides a summary of participant quotes relating to this notion.

Table 19

Individual Factors Promoting Bushfire Preparedness - Responsibility to Others

...oh just because I think I have to set an example for starters and and also because this place has been designated as a safe haven I feel I have an obligation to you know be able to save the house you know if the worst happens and also provide a safe place for people (Carmen from Middleton)
...the fact that you know, they've been cutting back the bracken and they've come over and done a bit of ours as well (laughs) it's just because our, we are quite close umm and we have a lot more trees around our place than they do, they're sort of wanting us to, for their own safety, to be prepared as well, they probably wouldn't mind if we chopped a few more trees down actually (Ellie from Kettering)
...when they moved in, because...we thought it was a very bad position to build a house we said to them 'if anything happens, feel free to just drive through our fence'...whereas next door and us already have a gate so we are going to put a gate on there too and then I put that tank on for that fire pump in case they needed to use a fire pump up there (Kenny from Middleton)
…Well I just thought from a practical point of view, if they call here [Tasmania Fire Service], and you know, they haven't got the right fittings, well it could mean the difference between, you know saving...the house here or somebody else's house or the vegetation, and I think that's rather important (James from Binalong Bay)
...and similarly with the bush on my block, well if that starts burning, that could burn my neighbour out, and I like my neighbours...they're two nice people with a dear little girl, so you know, my fuel can actually ignite their house (Jill from Ridgeway)

As such, there is a sense that feeling responsible for others' safety, or a notion of 'social responsibility' prompts individuals who have an invested interest in their community (place attachment and sense of community) to prepare for bushfire. This supports Wandersman et al.'s (1987) study of neighbourhood improvement

groups in the US and Israel, which cited personal gains and helping others as the benefits members felt from being involved in such groups.

One possible explanation for this finding that feelings of responsibility for others' safety motivate actual preparedness may be that people believe that it is the moral thing to do (e.g., see McIvor et al., 2009). As discussed in Chapter Three (section 3.2.3) feelings of personal responsibility for hazard preparedness have been acknowledged as a motivating force for adopting preparedness behaviour (e.g., Bird et al., 2010; Martin et al., 2009; Perry & Lindell, 2008). Ellemers, Pagliaro, Berreto, Manuela, and Leach (2008) further suggest that moral judgements are important influencers of people's evaluation of the groups they belong to. People consider it important that others see them as being moral and as such, if hazard preparation programs were framed in terms of responsibility to the community and being seen as a responsible resident, they could tap into these pre-existing moral norms and increase the efficacy of these programs.

Furthermore, the more involved a resident is in community activities, the stronger their ties will be to that community (psychological sense of community and place attachment); residents without these strong ties and lack of attachment to place will feel a reduced moral obligation to their fellow community members. In her cross-nation (Canada, the US, and Australia) qualitative study of community bushfire mitigation programs, McGee (2011) found that the 19 participants, as well as being involved to increase their personal and property bushfire safety, also spent considerable time helping neighbours protect themselves against bushfire.

8.3.1.3 Previous experience

Another factor found to have a complex influence on decisions to prepare was previous experience. Due to the mixed results in the hazards research of the effect of previous experience on preparedness (see section 5.2.2.3) and its limited ability to provide significant variance in SEM analysis, it was not included in the Model (Figure 6). However, analysis of differences between individual and community variables provided in Chapter Seven demonstrated the influence of not only individuals' own previous bushfire experience, but also individuals' vicarious experience (i.e., talking with friends/family who have experienced bushfires), on the adoption of preparedness measures. These results demonstrated that regardless of the type of experience (direct or indirect); residents were significantly more likely to prepare than if they had not had either direct or vicarious experience.

Responses from interviewed residents provides partial support for this finding and supports previous literature (e.g., Donovan, 2010; Martin et al., 2009; McIvor et al., 2009) which suggests that previous experience can act to both promote and inhibit the adoption of preparedness measures depending on the consequences of the resident's experience. Table 20 provides extracts from interviewees demonstrating the complexity of this variable.

Table 20

Influence of Previous Experience (including Vicarious) on Decision to Prepare

Promote Preparedness Behaviour	Hinder Preparedness Behaviour
With the sprinkler I put in...it's a matter of just connecting the petrol pump...and then into...the pipe, 2 inch pipe and then up to a big brass knocker sprinkler so that just wets the whole property [*So when did that go in?]* Umm after the Scamander fires here...think I'm much better armed and err yeah, having gone through umm the experience (2004 East Coast fires)(Garry from Scamander)	...what they had back in 1967 is what we've still got now, which is only really the garden hoses and stuff...so yeah I mean, knowing they got through '67 with pretty much just fire hoses, the bushfire would have been exactly the same if not worse [than catastrophic], I mean the fire itself was pretty horrific (Amy from Snug)
...we've had 2 good fires through here, one really big one, and that was in 1982, and we would we wouldn't have been anywhere near as well prepared then as we are now...*[did that prompt you to prepared more?]* Oh yeah, definitely, you know, it's just excepted the things like the other bushfires start to wake you up as to how vulnerable you are and that kind of thing (Sam from Bagdad)	...we've got, the gentlemen I spoke about that fought the previous fires *['67]* and intends to fight this one, but just think he's you know, it's nearly, what is it, 30 40 years later and that concerns me that he's going to continue to stay and fight, I just don't know that, and they're elderly yeah (Erika from Fern Tree)
...well there had been a series of smaller fires in the Fern Tree area going back the 25 26 years, there would never be a fire season without a fire somewhere in this area, and then the big one that did the Southern Outlet and Summerleas Road, you know, 10 years ago? *['97]* yeah that one there, that spurred us on a little bit more, to clear back a bit more (Sandy and Gus from Fern Tree)	I've got, one of my best friends survived Four Mile, the Four Mile Creek fire, and he said it was frightening and he'd been in the police force so it took a bit to frighten him... he had fire storm went right over, and it was over in about 20 seconds, so I've had a firsthand account of what it's like...he stayed and defended, and he didn't have half the equipment I've got, he only had domestic hoses (Graham from Binalong Bay)
[Why do you prepare?] Oh I don't know (laughs), like I've seen two houses burn to the ground that's when I was the Oyster Cove brigade down south of Hobart, yeah not a pretty sight you know umm especially when people just get out with their underwear on so (Jeremy from Binalong Bay)	...umm I'd weigh up where it was, which direction it was coming from, I'd take a much better overview of knowing how winds can change and bring things down on you, again I think, I think I've gone through a catastrophic situation because of the ferocity and the speed that this thing travelled at…Garry from Scamander)

Interestingly, as the quotes from Table 20 demonstrate, residents who had personally experienced bushfires were prompted by this experience to prepare/become more prepared, while indirect or vicarious experience acted to hinder bushfire preparedness. The fact that vicarious experience relies on the inferences from social comparison; it is thus a less dependable source of information about the individual's own capacity to adequately adopt these preparedness measures. Furthermore, due to these behaviours being induced by modelling alone, they are likely to be weaker, more vulnerable to change, and thus less likely to be maintained reducing the rate of preparedness adoption (Bandura, Adams, & Beyer, 1977). However, it is not possible from these qualitative data to determine if personal experience caused people to become more prepared, if vicarious experience acted to hinder preparedness, or if other factors were acting on this relationship.

These preliminary findings did however somewhat support the research conducted by Paton et al. (2001) who compared the effect of direct and vicarious (people are aware of the hazard activity occurring in other parts of the country but are not directly affected) experience of volcanic hazards in two communities in New Zealand. They found that although direct experience increased knowledge and awareness about a hazard it did not increase preparedness. Vicarious experience did not increase knowledge or awareness, and nor was it found to be related to preparedness.

As previous literature suggests, and as the present study's findings support, the effect of previous experience on future preparedness decisions and actions is very complex. It thus warrants further exploration in future research. A likely explanation for why people who have previously experienced bushfire do not act to adopt

mitigation measures for future events is the existence of cognitive biases (discussed previously in section 2.6.1.1). For example, the normalisation bias may explain how previously experienced relatively minor or 'unthreatening' bushfires become a 'template' for future conceived events and therefore these residents believe they will be able to cope with the same (if any) measures previously adopted (Mileti & O'Brien, 2008). Similarly, the Gambler's Fallacy (Jarvik, 1951) explains how for example a resident may have recently experienced a major bushfire and therefore believes the probability of them experiencing another one is very low. The reality is however that bushfires, like most other natural hazards, cannot be predicted and thus any estimates of probability can be misinterpreted. The following section therefore provides an exploration and discussion of cognitive biases evident in the telephone interview participants' responses.

8.3.1.4 Cognitive biases

As discussed in Chapter Two (see section 2.6.1.1), cognitive biases such as the unrealistic optimism bias, interpretive bias, and normalisation bias have been suggested by past researchers to explain why some people fail to adopt adequate protective measures for natural hazards (e.g., Ballantyne et al., 2000; Eriksen et al., 2010). Data from interviews with residents of the present study found support for the existence of cognitive biases in explaining why some residents had not prepared for bushfires, or whose sense of responsibility had somewhat shifted from themselves.

Evidence of the normalisation bias can be found in the extracts provided by Amy, Erika, Graham, and Garry in Table 14 and demonstrates how previous experience or someone else's experience and the resident's perception of this, can have a significant impact on the way they perceive, and therefore prepare for, future hazard events. The following comments from residents provide further evidence of

this normalisation bias and the effect of previous experience on the perception of future events.

> *(Have you ever had any experience with fires there in Bagdad?)* Yeah, um we've had 2 good fires through here, one really big one and that was in 1982, umm and we wouldn't have been anywhere near as well prepared then as we are now, um but basically all around us burnt out that's the timbered areas, but most of our property, about three quarters of it is pasture so that didn't burn... (Sam from Bagdad)
>
> ...well, everyone talks about [the '67 bushfires] (laughs), like I said, where we come from we had bushfires like that well maybe not to that degree, but we had bushfires every year, so the '67 was you know, like when the National Park [in NSW] went up we'd just moved into a brand new home you know, and we looked like we were going to lose it (laughs) so but er as usual the wonderful fire fighters do a great job and they stopped the fire at the right time...(Kenny from Middleton)

The extract from Kenny above reflects the normalisation bias that often occurs when residents have only had positive experiences with bushfires in the sense that the fire fighters arrived in time to control the fire before it threatened the resident's property. This sense of reliance or responsibility of mitigating bushfire threat resting on the fire agencies diminishes the likelihood that people will adopt further/any bushfire preparedness measures. This sense of responsibility will be discussed presently in this chapter, and the reliance on fire agencies in subsequent chapters.

The unrealistic optimism bias (Gold, 2008; Weinstein & Klein, 1996) depicts the sense that although individuals except and believe in the efficacy of adopting preparedness measures, they believe this information applies to others and not themselves, due to them believing they are already adequately prepared. Table 21

provides extracts from interviews with residents portraying evidence of unrealistic optimism.

Table 21

Extracts from Residents' Interviews Eliciting Unrealistic Optimism Bias

Do you think you're more prepared than other people in your community? Now, let's think outside Bracken Lane (G:) Yes (S:) yeah, yep yeah (G:) you have to think outside Bracken Lane, you're quite right there (S:) I'd say so, as a matter of fact we were just coming along Pillinger Drive and I saw a house that had trees probably 8 to 10 inches growing out of the spouting (G: hmm) (Sandy and Gus from Fern Tree)
...even down the Falls there is a house, that is...what we call near the high rocks, sits on a cliff, why on earth anybody would build their house there beats me but um, heavy bush line there and the fire would probably come, may well come straight up the bank and when it comes straight up the bank it's got more bush behind it than anywhere um, no I wouldn't want to be there (laughs) and if it was catastrophic you'd just, you'd go... (Amy from Snug)
What about your neighbours? Do they prepare? Not that I know of, they haven't got the equipment we've got, well I'm starting to, well we did have a Red Cross meeting from Red Cross who said we need an emergency kit, and I think we're starting to getting together an emergency kit, i.e., a battery radio or a wind up radio, touches, I've got one pair of flame overalls, probably get another pair,...boots, torches, canned water or bottled water, cause the water supply might get tainted, something to get, there could be a flood or other things that cause you to be marooned at Binalong Bay, could be anything. It's an emergency... (Graham from Binalong Bay)

This has implications for risk communication and preparedness education as residents holding unrealistic optimism bias may attend bushfire information nights at the local community hall for example, and although they will acknowledge the importance and efficacy of adopting the measures recommended by the fire service, they believe they have already adequately adopted these measures and consider the information given to them more relevant to the other community members in the audience (see also Paton, Smith, & Johnston, 2000).

When asked why they continued to attend such information sessions, these residents would often reason that hearing the recommendations would reconfirm for them and reinstate their confidence that they had done all they could do to prepare. This example of selective attention highlights the inadequacy of relying solely on information dissemination community education formats as the primary means of delivering bushfire preparedness information, as residents attend only to the information that confirms their level of preparedness is adequate. Continued attendance of community bushfire information sessions was also cited to act as a reminder of what actions to adopt, an annual prompt to adopting them, and just in case new information was offered.

> ...I continue to go [to community bushfire education] because...there might be something new come out like the new you know, the fire warnings that are going to come over mobiles and erm landlines and all this business... (Betty from Middleton)

However, the trouble with the passive dissemination of information is that people have different perceptions of how measures are adequately adopted and to what level, and do not have any opportunity to compare directly their own and others' actions in order to develop a tangible basis for comparison. For example,

what exactly constitutes ‘adequate vegetation clearance’ around a property or ‘ember-proofing’ a home is very subjective. Pat explains the inherent danger of this assumption and explains why she continues to attend:

> Well I think you learn things by rote (laughs) you know, if you learn it over and over and over again it’s going to stick whereas if you think you’re prepared and and you don’t go to these things well you could be caught out, umm you know, I think it’s important to keep abreast of things and there might be something new that’s being presented, well then you would go to it... (Pat from Middleton)

Pat illustrates another important element of effective education and that is repeated exposure and learning. These findings therefore lend support for bushfire education that involves physical and practical demonstrations of recommended mitigation adjustments and the reinforcement of such knowledge through repetition. This suggests that community bushfire education formats should provide ‘real’ examples of well prepared properties so that residents can accurately compare what they themselves had done against properties deemed prepared by the fire agency (this proposal is addressed in Chapter 9).

Another bias that was evident and related to residents’ strong attachment to the natural environment in which they lived, is the interpretative bias known as risk compensation. This construct describes how people maintain a balance between the perceived level of security proffered by their environment and their need to take action to manage their perceived risk (Paton, Smith, et al., 2008). The following table (Table 22) provides examples of risk compensation expressed by residents.

Table 22

Extracts from Residents' Interviews Eliciting Interpretive Bias (Risk Compensation)

We've got an actual cave on the property so that's where we, our back-up place to go and hide umm, preferably we would like but if it got out of hand to the point where something went wrong, well, we'd just go to the cave and wait for the fire storm to pass... (Clint from Bagdad)
...outside of that [leaving early], I'd have to umm I mean you know, if, there are options up in town and and you know, there are sort of a fair few option in terms of just places to shelter for a period of time... (Merv from Snug)
...and our house, we would...defend to the extent that we physically could, umm but we've got a big defendable cleared space beyond the house um where we've planned to put our campervan and our car umm and have water a water supply there and umm and just sit it out... (Ruby from Bagdad)
Umm, I'd say that we'd probably, the beach, comes to mind, which isn't far from us umm we'd be safe on the beach, our car would probably be incinerated, where we, at the car park... (Tony from Binalong Bay)
So back to your plan of leaving early, (yes)*...have you thought about where you would go and what you would take and when you would go?* Umm, not not not really, but I have thought we'd go early um so we've got plenty of time to think about those things and I don't know where, but um I have I am aware that there are two ways out of here (laughs) yeah I've sort of thought of that, um and and you know if all else failed the water is nearby, um so we'd probably head for that if all else failed... (Ellie from Kettering)
...we will leave when they [fire service] tell us to leave, that's fine, but if it just comes up, you know, within the hour and we haven't had time, umm we'll umm, we'll go down to the creek, we've got a creek running through and umm we'll just run down there, it's very very wet and leechy and all that, but that umm the stuff down there is just not umm dry enough to burn so, but I mean that's not an option I want to consider, it's my worst case scenario one... (Sarah from Fern Tree)

As these extracts demonstrate, residents were often very confident in the ability of nearby environments such as caves, beaches, cleared spaces, nearby towns, and water sources, to protect them from worst-case scenario bushfire situations. Furthermore, the unrealistic expectation that they would receive timely instructions or warnings by fire authorities, and had not considered typical bushfire

characteristics such as loss of electricity, confusion and reduced efficacy due to psychological distress, as well as verbal and visual disability due to the smoke and noise of bushfire, suggests and provides further evidence to support the findings of Chapter Six, that people do not consider 'leaving early' as requiring substantial planning and preparation. These extracts demonstrate that although considered most dangerous by the fire service, leaving at the last minute was implied by many residents as being a viable option due to their belief that their environment would proffer adequate protection from a bushfire threat.

8.3.1.5 'Preparedness fatigue'

Another theme that emerged from the interview data and which provides a novel contribution to hazard preparedness research was the finding that residents who were very prepared and very conscious of being bushfire prepared, started to become weary/fatigued from remaining this constant state of vigilance and readiness. As a result, some of these residents had even contemplated moving out of the area (that they were so attached to) because they were experiencing this 'burn out' (Table 23).

Table 23

'Preparedness Fatigue' of the Very Prepared

...but I also get a bit fired out and I just think sometimes 'god I've had enough, I'm just exhausted looking at this stuff' I need to sort of go and get my brain in gear on other stuff rather than forever be (laughs) thinking about smoke and fire you know (Murray from Fern Tree)
...my husband...managed to get me away on a little campervan trip up to Cradle Mountain one weekend in, it might have been in late January I think, and that would be a time of year I'd feel usually reluctant to go away in case it was bushfire weather, but I, you know, so I thought 'ok, think through this rationally, look at the weather map, it is going to be, it'll be in the mid 20s, you still could have a fire but you've got to have a life, you have to kind of pace yourself so that you do have a life as well (Jill from Ridgeway)
I think probably some of what happened in the intervening year is that I got really very wound up and very consumed by the whole thing you know, last year and I think what I've come to, and not without some effort, is just being a bit more matter of fact and relaxed about and a bit more fatalistic rather than feeling like somehow or a rather I can prepare myself to fend off some catastrophic event, which is, you know, not possible, so in that sense I would say that my energy is less tired up in it (Maggie from Middleton)
I think just because um we're doing, we've been doing a lot of things on um on the fire sort of prevention side and um I think we're just getting a bit tired of it and it stops every now and again so we sort of stopped...I get tired of them, what has seemed to be you know, a continual preparedness, preparing for fire and this summer has been just so nice, I thoroughly enjoyed it (laughs) and people have been saying 'it's been so cold and so miserable' and I say 'oo, I didn't mind it'...we don't go away...on a nice warm weekend because we're worried about fire, I just don't want to live the rest of my life like that...perhaps it'd be nice if we lived somewhere else (Jack from Ridgeway)

This finding provides a novel addition to the hazard research and has strong links with the compassion fatigue, workplace 'burn out', hopelessness, and helplessness literature. A key point here is that these individuals are lacking motivation to continue maintaining this high level of preparedness; they are lacking positive reinforcement. Arguably, this motivation would be renewed if they were to

(again) experience a bushfire so to reinforce their preparedness behaviour and reward their continuation. This scenario, of course, should not be wished upon anyone. As such, to combat this 'preparedness fatigue' more frequent rewards/incentives need to be provided. A possible solution may be adopting or viewing certain preparedness measures as 'dual purpose' as discussed in section 8.3.1.1. For example, as Carman explained, the sprinkler system they had installed also acted as a watering system for their garden. In this way, the preparedness measure that had been adopted (i.e., sprinkler system) was not a constant reminder of a bushfire threat but provided a very positive solution to an everyday problem.

As such, most measures adopted for bushfires (e.g., sprinkler system, water pump, emergency kit) can, and arguably should be, associated/utilised in more day to day activities so to reduce the anxiety attributed to these measures. Therefore, measures that are recommended for bushfire preparedness should also be promoted as having other benefits (e.g., an emergency kit including important documents, valuables, bottled water etc., is just as important if going on holidays, emergency trip to the hospital, flood inundation), and as such would arguably be more readily adopted. Therefore, although the long term goal is to be prepared for a major bushfire, if agencies promote the short term benefits of adopting such measures, it is more likely that they are maintained and the residents do not experience 'preparedness fatigue'.

8.3.2 Social/community factors

8.3.2.1 Influence of 'community'

Sense of community and involvement in community activities, factors demonstrated in the Model (Figure 6) to be predictors of actual preparedness, were again supported by data from participants' interviews. Residents explained that community narratives or stories that they had heard/obtained from other community members when they moved to the area or over time had initially contributed to them becoming aware of, or paying heed to, the bushfire risk in the area (see Table 24).

Sense of community (for full definition see Chapter 3, section 3.2) comprises multiple dimensions including membership, influence, shared emotional connection, and needs fulfilment and is therefore a persuasive social force (McMillan & Chavis, 1986). As such, and as was more fully elicited by the interview data, if someone within a community prepares for bushfires and they are a valued member of the community, other members may feel 'persuaded' to prepare also. As a result, these social norms are subsequently reinforced through the continual interaction and sharing of information between the community's members. Interviewees who had adopted or were intending to adopt preparedness measures suggested that this was often because they felt a sense of 'positive peer pressure' from other members of their community (Table 25).

This sense of 'positive peer pressure' in promoting fellow community members' bushfire preparedness provides further support for the significant influence of residents' social environment. This social environment was also found to be an important source of information on bushfire related issues.

Table 24

Community Factors Promoting Bushfire Preparedness - Community Narratives

Well when we very first moved here because people were still talking about the 67 fires and some of my friends that we met up here, kindergarten mums, had actually lived through the 67 fires and they spoke of those events...so it was just, it was always just sort of general talk, it wasn't panic talk it was just like, you know, 'what are you doing in the weekend?', you know, go to church on Sundays, fire meeting Monday, it was...no big deal out of the ordinary it was just the way we lived (Sandy from Fern Tree)
There's quite a lot of people who were here in the '67 fires and as soon as we moved down here, we heard nothing but, 'oh in the '67 fires', and I mean we had a commemoration thing here a few years ago (Prue from Kettering)
Well, we heard about the '67 fires, and then we just became aware that we were living in a bushfire prone area...it's just people talking and saying, yes you know, we've got to get ready, we've got to be prepared, it's a matter of when, not if, bla bla bla you know (Betty from Middleton)
When we first came to this area there were a few survivors of that fire still living in our area there, a few older people, and I can remember meeting one elderly man...remember him saying you know, 1967 he was walking down the street and he turned behind him and there was this huge ball of flames just coming up the street behind him... some other elderly residents...the Tagg sisters, they would tell new residents some of the stories about the '67 bushfires, that's right, they had photographs of their original homestead before it burnt down (Jill from Ridgeway)
I think the first summer we were here, the fact that we heard about the bushfire of '67 and err well, we could see that there would be a risk, so we started preparing, it didn't force us to move away (laughs) (Pat from Middleton)
...it's something that we realised was an issue because we found out when we bought the place that a fire had gone up in the property we had been concerned about across the road...and the lady that we bought this from...thought the house, this place was going to go...so we've done things also like getting rid of any trees that are under powerlines...as part of the preparation that we've done as well...we've just been sort of going to any of the bushfire information things that happen and so trying to get as much information as possible on what we can do to sort it (Rosie from Gordon)
...one of the gentlemen down the road, he'd actually been here in the last fire so he talked through sort of some of the experiences and that sort of thing so just sort of getting that the reality of it I think was sort of good cause you sort of think 'oh yeah, bushfire' and I think everyone's got different images but I think it's, yeah, it was interesting just hearing about the smoke and about you know that side of it (Erika from Fern Tree)

Table 25

Community Factors Promoting Bushfire Preparedness - Positive Peer Pressure

...we can help our neighbours we don't really talk to by just doing a lot of brush cutting up to the edge of their property...like I don't know that they've had the chat with the fire service, so I sort of feel like I can help, you know, both by bringing our cleared, extending our radius you know, right up to their property and perhaps right into it and hopefully encourage a shared responsibility there (Cam from Fern Tree)
But I think well, we're sort of a close knit community in this tiny area with the people on our fire tree, and you know they've sort of embraced the ideas of everyone else... (Pat from Middleton)
...we're very close to all of our neighbours, emotionally not physically, but um so pretty open, but around that sort of stuff, it's just that they're clearing you know, up to our fence and so forth and you know, they've actually come over with their whipper-snippers that (laughs) you know, that's fairly obvious... (Ellie from Kettering)
...we've got some very good friends here...you'd think they'd be the most aware and educated because they're highly educated people, but they said to us even on a catastrophic day, that they plan to stay in their place...so, again it's pacing and not earbashing people I'm going to give him the report and say 'oh I remember you said you might read them, here they are'...see you have these relationships with people in the community and every now and then there might be an opportunity to discuss it with people but, you know, you can't force it down their neck or anything like that... (Jill from Ridgeway)
...we had new neighbours move in at the top of the Lane and so we all we all went, they invited us, and we all went there for a house warming for them and they were made aware of the bushfire situation and joining up and they've been sort of brought into that group (Sandy from Fern Tree)

8.3.2.2 Sources of information

The influence of other likeminded community members, with whom the residents identify with, is reflected by interviewees explaining that information about bushfire risk and preparedness was first and foremost obtained from friends and neighbours (Table 26). This supports the Model (Figure 6) which showed that sense of community predicted empowerment and community involvement, which in turn predicted actual bushfire preparedness. Friends and neighbours are often people's first point of call if they require information about some uncertainty or to problem solve daily hassles (see section 2.6.2). Extracts from residents provided in Table 26 suggest that other community members are preferred over agency or more formal

sources of information because of accessibility, trust, and confidence that information that they will obtain will be context specific and feasible.

Table 26

Sources of Information - Friends/Neighbours

...and then someone at her work I think just said 'look, why don't you just leave' and she came back and said this and said 'yep, I like that idea' because it was going you know $10,000 constructing a bunker for a start... you tend to get all tangled up in your own view of stuff, which can happen in all aspects of life, and often I think it takes someone, an external view to say 'hey, what about this'... (Jack from Ridgeway)
Well, I'd like to look into...a friend...he's in the Middleton area, they've got, they're quite well prepared, they've got all that sprinkler system up...also he's done these covers for the windows to protect them, we wanted to sort of look into doing that umm using some sort of a umm a reflective foil type thing that this fellow's got... (Rosie from Gordon)
...and the use of fibre-glass or metal tanks not poly tanks you know...a friend of mine up the road said he was standing there with all the water pressure and suddenly it just died and he thought 'how could this be, I haven't even had the hose on for five minutes' and he looked around and there's his tank melted and all the water just gushed out...the fire was right on him and he just fled then with sparks flying at the back of his van and his dogs (laughs) and yeah, he was hellishly lucky to save his house... (Garry from Binalong Bay)
[Friend in QLD floods]...he made the decision, they made the decision to stay, they're trapped, they're trapped in Karalee, they can't get out...but what it's done, it's actually gave me food for thought to think that, to revaluate what I'm doing... (Clint from Bagdad)
...I...tend to just I just ask friends...and I'm just kind of just constantly like 'oh what should I do here' you know...cause we have a lot of people in the same situation as you know, buying houses and stuff, you kind of, there's huge amount of shared knowledge (Cam from Fern Tree)

The benefit of localities with a strong sense of community is that information and resources can be shared around a larger group of people and tend to be shared naturally through/in regular interaction. In other words, these residents have greater access to local knowledge and resources. The advantage then of local fire brigades in such communities is that members are first and foremost community members, and then brigade members. As a result, interviewees from towns with a high sense of community often had access to and explained that friends, who were also volunteer fire brigade members, were usually their first point of call when they needed bushfire

related information (Table 27). The advice from such ‘firie friends’ was held in particularly high regard because this information was obtained from friends (first and foremost) who also happened to be especially trained in bushfire risk reduction. This finding supports work by McGee and Russell (2003) who found that local volunteer fire fighters were seen as the most valuable sources of fire and preparedness information by other community members.

The emphasis of the information provided by these ‘firie friends’ being delivered in a mutual, cooperative, and context specific way, as well as the fact the advice has come from a ‘friend’, reflects the nature of delivery that is most effective. As such, the way ‘firie friends’ deliver information should be used as a template for the whole fire service to ensure that the information is provided a hearing in the first place.

However, it must be said that in many instances, for example Maggie from Middleton, the ‘firie friend’ was a ‘firie’ first, and then became a friend. This is especially poignant as these individual volunteer fire brigade members, who feel a sense of responsibility to ensuring their community members are aware of bushfire risk and adequately prepared, earn the trust and respect of these residents to the point where they are considered a friend. From mere ‘firie’ to ‘firie friend’ is testament to the individual volunteer’s ability to empower these community members who in turn reward them with their trust. This relationship; sense of community, community involvement, empowerment, and finally (trust and) preparedness, was supported by the Model (Chapter 6, Figure 6).

Table 27

Sources of Information – Fire Brigade Friends

Look, I'd talk to one of the local fire [volunteer] brigade people, I guess because at least 3 of them would be close personal friends, so that'd be me first point of call (Sam from Bagdad)
...a friend of mine is one of the...fireman at Jericho, I talk to him about it, cause my father's passed away and I said to him because we ride together and that, he said 'oh just start a little bit buy a little bit each year' he said, by the time it, hopefully it doesn't happen but he said if it does happen he said 'you're going to have a fair bit of equipment'... (Clint from Bagdad)
...Reece was the captain for ages and ages, he's a friends of ours and he just walked through, I think we asked him to and he was the one who had said that you know, these things, if it was a hot fire that just raced it would go through quickly and we hadn't thought about that sort of time frame and this talk about an area, a place of safety... (Prue from Kettering)
I had with a friend [volunteer brigade member] who came here and checked out the pump for me, and he made one recommendation which I have acted on in terms of my fire hose, but it was the first really, 'this is the way it is' conversation I'd had with somebody who I think is really quite knowledgeable and just discerning about this kind of thing, and that is...unless, you know, you leave the day before (laughs)...it's quite likely that you're going to have to take refuge here, you're not going to get out of the lower Channel, full stop... (Maggie from Middleton)
I mean the fire brigade aren't too far away from us anyway, and a lot of firies live around us so and we've got neighbours who are firies so, that's helpful (Sarah from Fern Tree)
...the other thing is *Garry Harris [synonym] we know him, who's the guy with the fire brigade, *(that's the chief?)* I think he's the chief yeah, Garry's the chief, so I expect we'd um if we really wanted stuff we could talk to him about it (Amy from Snug)

8.3.2.3 Family dynamics

Trafimow and Fishbein (1994) suggested that certain referents, or sources of information are salient only in specific situations. As such, 'firie friends' may only be sought for information in the context of bushfires and preparation for them. Other referents, such as family members (e.g., parents or spouses) are important irrespective of the behaviour under consideration (Trafimow & Fishbein, 1994). This was reflected by the interview data.

While friends/neighbours and 'firie friends' were indicated as important sources of information, attitudes towards bushfire risk and preparedness was very much influenced by the norms and attitudes of the rest of the family. This influenced decisions both to prepare and not to prepare. Amy from Snug (as introduced in Table 14) provides an example of how her parents' previous experience in the 1967 bushfires had shaped her attitude and her ability to prepare for bushfires. When asked if she considers herself and her family physically prepared for a bushfire, Amy explains "…mmm, no, probably not. What we've got now, what they [parents] had back in 1967 is what we've still got now, which is only really the garden hoses and stuff…" As well as acting as a normalisation bias, this extract illustrates the powerful influence of family norms and that it is often difficult to promote behaviour change if it is not congruent with the rest of the family. As such, it took another family member's influence to change Amy's behaviour;

> ...when we last spoke I told you that my brother...was thinking of joining the volunteer fire brigade at Snug and he's done that...so he's being going to all the weekly meetings and stuff, he enjoys it.. he brings home ideas and stuff like that so yeah and...now sort of says to me, what we would be fighting would be embers here...so, it's good that he's getting that sort of knowledge (Amy from Snug, follow-up interview)

On the other hand, if bushfire preparedness is established within the family culture, is a family norm, it seems likely that other family members/future generations will also adopt preparedness measures. As Clint from Bagdad explains;

> …I come from a family, my father was a fireman so that gives me a heads-up if you know what I mean, so yeah, and it's just, it's just part of my bigger plan, the whole plan...

Family dynamics were found in the interview data to have a further fundamental influence on people's level of preparedness. For example, in many families, there is an unspoken, implicit assumption that others in the family know what the Fire Plan entails, or that one partner knows what the other is likely to do in the event of a bushfire (Table 28). This therefore provides support and further insight into the issue of family assumptions first highlighted in Chapter Six (section 6.2.3).

Table 28

Family Dynamics - Family Plan Assumed/Not Explicitly Discussed

...my brother that lives at Margate...I mean I think if something happened here, and he knew about it, he would be here umm so yeah... mum does part time work, potentially she'd be in the district so if anything happens she'd be home but yeah, my dad is not very well so I don't think he'd be able to do very much, *(have they considered leaving or is that just not an option?)* don't know, haven't asked them [Amy lives with parents] (Amy from Snug)
...Err, oh yeah no we have in a way [discussed plan], I mean I, she knew that doesn't matter what happens, I'll stay, and she probably just thinks that I realise that she will too (laughs) I better ask her *(it's implicit?)* yeah yeah, sort of yeah, and she's pretty fit, well capable of being able to stay, yeah... (Sam from Bagdad)
(So you have talked to your wife and kids about what's going to happen, have you got a bushfire plan) Oh no, we need to polish up on that (laughs) (Tony from Binalong Bay)
Yes, yeah I I, that would be one of the considerations [leave if 'catastrophic' forecast] yeah, I wouldn't rule it out at all *(have you spoken to Doug about that? Would he leave too?)* Oh no we haven't talked about that, I wouldn't, not sure...yeah I must I must talk to him about that...mm (Ruby from Bagdad)
...if I was going to defend it with whoever was available to help me whether it be other family members brothers or you know *(discussed with brothers?)* No, having, that's an expectation I would have, umm I mean I could easily have that conversation...they've, I haven't actually been involved, I'm one of four boys, they've all sort of helped each other at various times when there's been smaller bushfires so it's more of an expectation, [it is] probably a good conversation to have (laughs) (Merv from Snug)
...so family we'd go to essentially I think [if leaving] *(is it something that you've discussed with them?)* Er yeah, they've actually got their fire plan and stuff as well so, I think it's, well have we discussed it? That's a good questions, it's probably just assumed I guess (laughs) yeah (Erika from Fern Tree)

The dangers of such assumed understanding or role in bushfire plans include added confusion on the day of a bushfire and/or a false sense of security that more support/resources will be at hand. There is a sense that people include other family members in their fire plan to 'flesh it out', 'fill in the gaps', and account for contingencies, but these contingencies are rarely discussed with these 'included' family members and are rather just assumed. Of course the reality is, in a bushfire situation, it may be very difficult for people to enter or leave the affected area, or family members may be tied up defending their own properties.

Again this emphasises the lack of priority people place in formalising their fire plans, compared to more tangible fire preparedness measures such as conducting hazard burns or buying fire pumps. It further highlights the need for community engagement initiatives to target and engage every member of the family to ensure that everyone understands their own and others' role in the bushfire plan. This way, under conditions of stress and uncertainty inherent of major bushfires, residents will hopefully automatically act out their plan, reducing the likelihood of negative bushfire consequences.

Another feature of family dynamics that require additional investigation is the fact that many female partners or wives, do not engage in preparedness activities around the home. Table 29 provides interview extracts that support this gender difference first highlighted by the quantitative analysis presented in Chapter Seven (section 7.2.4) which suggested that women are more inclined to leave early but have not undertaken preparedness measures to do so.

These findings support and provide a further insight into the quantitative results discussed in Chapter Six which suggested that not only were women more

inclined to leave early in the event of a bushfire, but those who indicated wanting to leave early, had adopted significantly fewer preparedness measures (e.g., deciding where to go, having 'leave early' kit organised), compared to people who had decided to stay and defend. This suggests that women are not adequately informed about bushfire risk and how to mitigate it, and questions the effectiveness of current community education initiatives in targeting women. These data collectively illustrate the undeniable need to develop specifically targeted community engagement initiatives to improve women's bushfire preparedness.

Table 29

Family Dynamics - Women Reluctant to Engage in Preparedness Behaviour

...Ooh, the only thing she's [wife] got a little bit of apathy on learning how to use the pumps yet, I'm still trying to teach her how to use it, I think she thinks that...on the day everything will be fine you know, I'll be able to do it, I said 'if something happens to me you need to know'...my son knows how to use it, but I said 'if something happens to us and we're not here you need to be able to use it' otherwise you're going to you know, not have enough water... (Clint from Bagdad)
...like I mean if there's anything different I know that he will he will come, he will tell me and umm yeah it's yeah so it's sort of I figure, like if there's anything, and maybe I'm maybe rely on him too much but I would think, I mean, like they quite often I spose, the fire brigade or the, quite often get called to accidents down here, he would also be called to fires [because he is a police officer]... (Mary from Woodbridge)
*(So when you say you start the pumps and stuff every year... is she a part of that as well?)*No, no, she wouldn't be capable of staying by herself, I don't reckon, no that kind of, that's you know, that is a good point... (Sam from Bagdad)
...Um I've been shown [how to use fire pump] but I'm not sure if I'd remember it, I was actually shown last year so…I haven't looked at it since then...Yeah that's probably why I haven't looked at it so much *(because plan to leave early?)* yeah, I think I, if I was going to use it I'd use it in the earlier times to sort of dampen everything down and fill up gutters and all that kind of stuff so I wouldn't be under as much time pressure... (Ellie from Kettering)
...we bought a fire pump last year ...and hopefully that, that's in the garden shed...so we'd be able to hook that on to one of the tanks closest to the house and use that, if needed, mind you I need instructions on how to use it at the moment (laughs) but hopefully we'll never have pull it out of the garden shed, that's the aim... (Amy from Snug)

A further dimension to the complexity of tailoring more appropriate bushfire education programs for women is provided by the need to emphasise protecting children, especially if they are young. The complex interplay between the women's own beliefs about bushfire risk, their attitude towards protecting their children from such risks, and the resulting action (or inaction) from these beliefs is illustrated in the following extracts.

Ellie from Kettering has two children, 5 and 7 years old and although has decided to leave early, admits that her 'box of stuff' to take is 'not very good', and that she has not thought about where she would go in the event of a bushfire except maybe to the neighbour's house:

> (*Why are you going to leave early with your children?*) Umm, because I think the risk is too great for us to be umm, I don't want to talk in front of the kids but, trapped here, yeah, there's not enough, not enough escape routes I suppose... (*Have your children had fire safety talks from the TFS at school?*) umm no, I wouldn't bring it up with them, I think they're too young, that's my own belief...I don't expose them to a lot of stuff like that... (Ellie from Kettering, interview 1)

So ironically, in Ellie's case, there is a sense that by trying to protect her children from the concept of dangerous bushfires, it could be argued that she is actually endangering them by (inadvertently) not preparing adequately for its potential occurrence.

Mary from Woodbridge has a very different approach to preparing for bushfire and educating her children, 14 and 11, about the dangers. Mary explains that before summer she is going to purchase some plastic containers and have the children fill them with certain possessions in the event that they have to leave their

home in a hurry. When asked what she was going to get her children to pack, Mary asks the children:

> ... (laughs) I don't know [addresses children] kids, what are you going to put in the boxes? [boy: photos] photos, [girl: teddy bear] teddy bear, but she said she'd have that with her, [indistinct voices in background] money (laughs) [addresses children] would you take clothes? [Mimics] yeah, spare clothes; I suppose they're replaceable...

Mary's children also seem very aware of bushfire issues and bushfire risk. When Mary is asked whether there is a fire brigade in Woodbridge, she is unsure and asks children:

> ...See, isn't that disgusting. I don't even know, [asks children] do we have a fire station in Woodbridge? I'm pretty sure... [child's voice: 'yes, near the oval'] oh, near the oval [child's voice: 'god, you retard'], going by what the kids...see, they speak nicely (laughs)...

Mary explains that her children's awareness of bushfire risk is largely attributed to the local school's incorporation of the bushfire history into the curriculum, and the sharing of stories of the 1967 bushfire by older local residents:

> ...more with the kids through school. They've spoken through that way. Actually, my daughter was saying that the bushfires down here started on her birthday, the 7Th of February, the one in Victoria started on her birthday, the 7th of February (laughs), so yeah, I haven't actually spoken to them personally [local bushfire survivors] but they've, the kids have visited people, and, like through the school, and sort of they've had a bit more of a history of the umm of the local area so, yeah, I think they're sort of, well, they're more aware of it than I am...

When asked if her children think about bushfire and the risk, Mary asks her children directly:

> ...I don't know [addresses children] do you think about bushfire? [Mimics boy] yes, it's scary (laughs) and the other one is just looking at me blankly (laughs), [like] 'don't interrupt me, I'm watching the telly'...

Sarah from Fern Tree, who has four children between 10 and 12 years, has also discussed the fire plan to leave early with the family; "oh yes, everyone knows that we're leaving", and has planned to take the family's caravan full of supplies down to Kingston Beach (nearby beach) and leave family photos in the fire proof safe in the shed. Sarah's daughter even wanted to join the local fire brigade:

> ...Megan, my 12 year old wants to join the Fire Brigade...they had an open day last year, and there were three kids who put their names down, but they wanted more than three to start it up and so those three were really quite disappointed, Megan being one of them...so I wish there was more opportunity for the kids to get involved, I think you would, even if it was just those three initially, you know, it might just work...

Interestingly, in a follow up interview with Sarah a year later, she explains how the local fire brigade had in fact started up a junior brigade:

> ...they've (local fire brigade) got a young think up and running I think, they were er for cadets or whatever they are umm for kids around the area but unfortunately that was on a Thursday night and that's impossible for us to go to, for the kids to go to [because it clashes with Navy Cadets]...Harry, he's going to be 12 this year and so he could join by umm he's got no interest, he doesn't like the idea of fire at all (laughs)...

These extracts of conversations with women highlight the intricate relationship between the women's own beliefs regarding bushfire preparedness, their view of whether their children should be educated about such potential risk, and role of the children's school and social environment in developing their own view of bushfire risk. What does become clear is that for women with young children, any attempt to engage with and educate them about bushfires, must in some way take into account and incorporate their children to ensure maximum effect. This could be as simple as organising information sessions, field days, or workshops that tailor for the participation of children also, for example, by including show bags with stickers (i.e., fire agency children's education material), catering (ice creams, biscuits, soft drink), giving children the opportunity to hold a fire hose, to suggest a few.

The above extracts demonstrate the powerful ability of children to influence their parents' perception and attitude towards bushfire preparedness, and as such, maybe this should be harnessed in developing more effective family bushfire preparedness education. The effect of family dynamics on individuals' decision to prepare, or not prepare suggests that this would be an appropriate target for intervention (McIvor & Paton, 2007; Paton, Bürgelt, et al., 2008)

8.3.3 Salient themes from community/agency interaction

8.3.3.1 Effect of 2009 Victorian Black Saturday bushfires on Tasmanian residents' perception of bushfire

Two days prior to the official commencement of the Doctoral research on which this thesis is based, Australia experienced its most tragic bushfire and natural disaster, the Victorian Black Saturday bushfires (VBRC, 2010). Although this research is concerned with the bushfire preparedness of residents in Tasmania, it

soon became apparent that these devastating bushfires had far reaching and fundamental effects on people's perception of bushfire Australia wide, and subsequently bushfire safety policy. The ensuing Victorian Bushfires Royal Commission (2010) generated changes that were only beginning to be introduced during the initial stages of data collection for the present study and as a result, provided an invaluable opportunity to witness how fire management agencies engaged with their community to inform them of the new best-practice for bushfire preparedness.

One of the first changes that were made in response to February 7, 2009 disaster, was a new fire danger ratings system, which saw the introduction of the new level of 'catastrophic' (see section 2.4). The intent of this new rating was to alert the community to predicted fire conditions, and to recommend appropriate actions in such conditions. The recommended response for 'catastrophic' forecast conditions suggests that "leaving is the only safe option for [people's] survival – regardless of any plan to stay and defend" (Tasmania Fire Service, 2010). It was anticipated that this new system, with its clearly outlined recommendations, would simplify the decision making process for those at risk and thus reduce the likelihood of bushfire related fatalities.

How this new system was received and understood, and whether it has in fact made the decision making process easier for people living in bushfire prone areas is thus a pertinent research question. To answer this question, telephone interview participants were also asked what their perception was, and likely behaviour towards, the issue of a 'catastrophic' or 'extreme' bushfire warning.

What was initially very evident was that participants were not all entirely sure what ‘catastrophic’ actually meant (Table 20). Although there was an extensive media campaign and heightened interest in bushfire preparedness following the Black Saturday fires, when participants were first interviewed before the bushfire season of 2009/10 (approximately 8 months after the bushfires) awareness and understanding of these new changes was not largely evident

Table 30

Perception of the Word ‘Catastrophic’ and Understanding of the New ‘Fire Danger Ratings’

Er I don’t, ohh I spose I listen to it a bit when it first came out, umm yes it would guide my behaviour but I can’t remember what the categories, the ratings mean... (Tony from Binalong Bay)
I know there’s been changes but if you said to me now what changes are there, I I couldn’t be able to answer that...um I’ve heard it on the radio and TV but... (Denis and Mary from Snug)
In terms of leaving, we would have a chat of course and we would have a look at the, at the umm, what the umm, current standing was in terms of disastrous or bad, or not too bad, or whatever it is but...I mean if it came at the disastrous rating of whatever, I think we wouldn’t think twice, we’d go ‘bye’... (Sam and Esther from Binalong Bay)
Yeah if it wasn’t catastrophic, yeah I would certainly feel comfortable, yep, it wouldn’t be a problem [staying and defending]...*So I guess after Victoria, and the change, I guess just the wording essentially, it’s this word ‘catastrophic’ that has made people think?...*Yeah, it makes me think ‘well, what’s that really mean?’ yeah... (Phoebe from Snug)
But the other thing we decided I think this last year is that...if the fire danger was in the two highest categories, like catastrophic or um or tsunami, whatever they are, umm (laughs), extreme...our plan is that we would um, on a day like, if it was forecast, we would actually go away and go down town and that was not a part of our original plans before...the Melbourne, sorry before the Victoria bushfire... (Jack from Ridgeway)
Oh which one are you talking about? (*well the...)* well the last one or the second last? (*let’s take both*) oh well the second last I’d prepare to fight, the last one I have no choice, I’ve got to go...well the Law says I’ve got to I think? (Graham from Binalong Bay)

This general lack of awareness is supported by recent market research conducted by an independent body (Enterprise Marketing and Research Services, 2010) for the Tasmania Fire Service which suggested that awareness of the new Fire Danger Rating had actually declined since it was introduced in early 2010 (47% in November, 2010, compared with 73% in February, 2010). As such, half of the respondents (400 in total) were unaware of the new Fire Danger Rating, and 2 per cent were unsure (Enterprise Marketing and Research Services, 2010).

When residents of the present study were asked whether they believed an 'extreme' or 'catastrophic' fire event was likely to occur in Tasmania, residents' provided mixed responses. Answers ranged from '10% chance in 20 years', 'once in 20 years', 'yeah, quite likely', 'moderate', 'high', to 'Tasmania being one of three areas in Australia that are marked black on the CSIRO map of the highest danger risk of catastrophic fire'. Betty from Middleton explained:

> ...well certainly if they issued a catastrophic one [warning] I'd leave, yeah, I I just would, no point in…in, but I can't see it ever getting to that stage here...

Therefore, if residents do not believe that a major bushfire event is likely to occur in the near future, or is an imminent threat, it is unlikely that preparing for bushfire will be a priority in their day to day living (see also Paton et al., 2005).

However, even if residents did believe an extreme or catastrophic fire event was likely to occur in Tasmania, this does not guarantee that they act in the way recommended by the authorities. When asked if they would leave (as advised by the current warning guidelines) if a 'catastrophic' warning was issued; only a minority said that they planned to heed the warning and leave straight away (see Table 31 for

participants' responses). The responses to the question 'would you consider leaving in a 'catastrophic' fire situation' elicited obvious uncertainty such as "oh, I don't know" and "I haven't really decided", as well as responses that showed some level of planning had been engaged in but had not been formalised due to various factors:

Table 31

Residents' Varied and Incomplete Plans for 'Catastrophic' Warning

...well I'd certainly be keeping an eye out and I'd maybe go the quick walk around the defendable area here and just double check...and if it looked as well 'this is starting to look at bit umm worrying' I might then start thinking 'well', course I might be a little bit late, oh well I better chuck a few things in the ute and think about getting out of here... (Peter from Bagdad)
...we now say in most situations we would stay but there are circumstances in which it would be more sensible to leave... (Brian from Kettering)
...obviously if there was a catastrophic warning I'd be off...yeah, just basically depending on the weather and the wind and things like that... (Jackie from Snug)
...If it's a catastrophic fire I still think I would probably stay in the district but I would probably leave earlier... (Maggie from Middleton)

These responses suggest that the new rating system, especially the rating of 'catastrophic', as anticipated by authorities, have caused residents to rethink their bushfire plan in the event of such conditions. However, it appears that these plans are not reflecting those promoted by fire authorities. Responses from residents suggest that the decision to stay and defend or leave early is dependent on various factors such as uncertainty in their own ability to cope in the event of a fire (psychological preparedness; as discussed in section 2.5 is influenced by residents' perceived level of physical preparedness and previous experience):

> ...if they said that the fire coming towards us was you know, significant, but they hadn't classified it as catastrophic...umm, yeah, I say that now, but you know, I am sort of, in the back of my mind also can feel that maybe I would not feel like sticking around I don't know, I've never been in a bushfire so if it was bearing down on us, if it looked horrific I'd probably wanna get out... (Merv from Fern Tree)

Or dependent on pets and livestock (Proudley, 2009):

> ...well the change of plan, you know, the the change of publicity has sort of made, made us think again, but I have, we have animals I mean I have two horses and er... (Prue from Kettering)

> ...ohh, I don't know [leaving early if 'catastrophic'], that's a hard one *(and is that because you're taking into account your livestock and house?]* umm yeah probably, yeah... (Amy from Snug)

Some residents however, have heeded the authorities' advice and explained that if a catastrophic warning was issued, they would leave their home early and re-locate to a safer place:

> ...yes I mean if it was absolutely shocking and they were saying it was catastrophic and we really felt that we couldn't do anything then we would probably head off down to the oval...and you know, this idea of the safe refuge... (Prue from Kettering)

> ...umm I guess if it's the really really high fire warning, then and it was sort of catastrophic...sounding, we'd obviously get out...and umm just grab the photos and and...leave, you know, but umm...if if it was just a regularly, you know, like bushfires but not the catastrophic level... I think we'd probably have a chance to surviving it...umm, yeah, so we'd stay and ...and try and umm umm you know, save the place... (Rosie from Gordon)

However, for this to be a viable decision two assumptions need to be met. Firstly, this decision relies on authorities issuing timely warnings (and what constitutes timely is viewed differently by people – for example, Prior and Paton (2008) found that expectations of adequacy ranged from 2 hours to 2 weeks), because, as evidenced by the above, many residents will be waiting for the official fire warning of 'catastrophic' to be issued before they take action. It also depends on there being a nearby 'safe' and 'appropriate' (able to cater for the potential thousands that will be taking refuge there) refuge to 'leave early' to. So therefore, unless the authorities can guarantee both of these conditions (early warning, and identified nearby safe refuge), the recommended action issued by the authorities ('leaving early is the ONLY safe option') in the event of a catastrophic bushfire, may not in fact, be the 'safest option'. Ester of Binalong Bay voiced this concern:

> ... you can't release a catastrophic warning ...because, in the end people just ignore it, we just started ignoring all of these things because it is just such a waste of, it was just ludicrous... Well, a) where is the safer place ...for some of these people?, and b) there's not even a fire started so how many thousands and thousands of people do you want to pack up their homes and leave, to where? ... For what? So it's just the dumbest thing I think I've ever heard ... and I think it's alarmist to the extreme, so I think to come out with a catastrophic warning, before there's even a fire, is crazy...

The comments made by Ester also highlight a phenomenon that may arise in response to early warnings and which is very difficult for authorities to counter. 'Warning fatigue', or the result of too many early warnings or warnings without eventuation leading to disengagement, cynicism, or loss of trust (Nerlich & Halliday, 2007), may arise if the 'catastrophic' warning is issued to a general area, rather than

the specific area at risk, thus giving the message to a very large number of people that their 'safest' option is to leave. If warnings are not issued in a specific enough area or are issued without the threat eventuating (which will eventually happen), the 'boy who cried wolf' situation will arise resulting in residents not responding in the 'preferred' way when catastrophic warnings are issued in the future. Furthermore, this may lead to an increase in the number of residents who experience 'preparedness fatigue' as discussed in section 8.3.1.5.

To provide recommendations or review of this issue in detail is beyond the scope of this study, except to highlight the fact that 'warning fatigue' has arguably become a bigger issue since the introduction of the new warning levels, and this, as a result, effects the way residents make bushfire preparedness decisions.

Another supposition of communities' responding 'appropriately' in the event of a 'catastrophic' fire situation is the assumption that people actually know what constitutes a 'catastrophic' fire. Unfortunately, it appears that 'catastrophic' is often miss-used or not understood (as explored earlier in Table 30). As a result and due to humans naturally attaching meaning to things that they do not know or understand (e.g., Fiske, 1993) and because most of the participants have not actually experienced firsthand a 'catastrophic' fire event, many try to normalise or fix the term 'catastrophic' to previously experienced fire events (normalisation bias – see section 2.6.1.1):

> ...I think I've gone through a catastrophic situation...because of the ferocity and the speed that this thing travelled at, I think I've already gone through that so, and that'd be the only thing that'd prick my ears up a bit more would be the word catastrophic...other than that I'd say 'ohh been there done that'... piece of piss...
> (Garry of Binalong Bay)

> ...well depends whether you, well it depends on what you class as Catastrophic, whether you class the 1967 one as a catastrophic one or not ...umm, it turned out to be a catastrophic one ... I think there were conditions occurring then that wouldn't occur today... (Ivy from Fern Tree)

> ...although it was interesting because I would have thought that, particularly New Year's Eve [weather conditions], was a, was pretty pretty err it was not looking terribly good ...and the others were not as bad as that, but anyway, they've got their way of rating and that's the way it is... (Murray from Fern Tree)

This, unfortunately, may lead to unrealistic expectations regarding people's perceived ability to cope with future 'catastrophic' fire events because in their mind, they have already 'survived' an event of that scale. Similarly, they may assume that such fire events are unlikely to occur because conditions are not like they were in the past, or the very notion that a similar or more 'catastrophic' fire could eventuate is too distressing to contemplate, so they deny its possibility. The result of this perception unfortunately, is that these residents are unlikely to adopt new preparedness measures or take notice of new bushfire mitigation advice or education because they believe that this information is not applicable to them (unrealistic optimism bias; see section 2.6.1.1). As a result, these residents may not be as prepared as they could be.

A related issue that has emerged since the introduction of the 'catastrophic' level and the 'leaving early is your ONLY safe option' is the sense that the warning levels below 'catastrophic' are not considered serious enough by residents to warrant the same level of respect or action. As such, many residents suggested that they would stay and defend unless it a catastrophic warning was forecast (Table 32).

Table 32

Residents' Plan to Leave Only if Catastrophic Conditions or Warning Issued

... 'extreme's' got nothing, that gets you to move out of your house, extreme is get yourself ready...
...I don't think there's any worry about you know, high fire danger, we'll be, we're quite prepared for that but if we know that it might be catastrophic, we'd be gone...
...I think if it was something minor well fine, we would stay and see it through but if it was certainly catastrophic we wouldn't' be here, we'd be gone...
...we we'll still stay and defend unless it was classed as catastrophic...
...yeah, if it wasn't catastrophic, yeah I would certainly feel comfortable yep, it wouldn't be a problem...

The importance of understanding this phenomenon derives from the fact that the rating of 'extreme' goes up to a Fire Danger Rating score of 99 (only 1 below 'catastrophic'), and that fire agencies, including the Tasmania Fire Service, suggest leaving early is the safest option and only those residents prepared to the highest level should consider staying and defending. As such, just because 'extreme' is no longer the highest (worst fire conditions) rating, it does not mean that fires under these conditions are any less dangerous as described in the past. Just because the 'extreme' bushfire rating has not received the same publicity as 'catastrophic' does not mean that it also describes seriously life threatening bushfire situations.

This tendency of only considering 'leaving early' if a 'catastrophic' warning is issued may be a remnant mindset from years of public bushfire education that taught that 'people save houses, houses save people'. However, a mentality also seems to exist that 'leaving early' is a 'weak' or 'un-Australian' option. This can be seen in residents of the present study almost humanising their home and refereeing to

‘abandoning’ or ‘just up and leaving’ their properties if they decided to leave. This is consistent with the earlier finding of people’s extreme attachment to their homes (see section 8.3.1.1). However, it could also reflect a sense that it is more socially accepted to expend as much effort as humanly possible to save your home and maybe even a sense of it being ‘un-Australian’ not to. Whether staying and defending your home reflects an Australian cultural norm is beyond the scope of the present study but may indicate an important direction for future research.

Therefore, only at the level of ‘catastrophic’ where fire authorities have said ‘leaving is the ONLY safe option’ do people feel it is ‘acceptable’ to leave early, or ‘abandon’ their home. This has severe implications for hazard communication and education and suggests that the addition of a new ‘higher’ level of bushfire warning has made previous ‘high’ levels fade into insignificance, potentially resulting in increased number of people endangering their lives by not leaving until this ‘new’ ‘highest’ level has been issued.

However, perhaps the most concerning manifestation since the Victorian Black Saturday Bushfires, reflected by the interviewed participants, is the belief that some bushfires are just too overwhelming and uncontrollable, thus rendering any preparing useless. Therefore, people fostering these beliefs, or who have negative outcome expectancies (i.e., do not believe in the efficacy of preparedness measures mitigating the risk, or their own ability to implement them; Paton, 2003; see section 3.1), are less likely to engage in bushfire preparedness activities (as illustrated in the Model, Figure 6), and thus further increase their vulnerability to bushfires:

> **...**I suppose if you think about what happened in Victoria, they moved so fast that I don't even know that I'd have time to fill my gutters with water and yeah, I mean, yeah, I mean you can do, you can do so much, you can cut your grass, you can make sure things are cleared, you can do that, but in the end it still doesn't mean that you're safe... (Mary from Woodbridge)

If nothing else, the 2009 Victorian Black Saturday bushfire and the policy changes that ensued as a result of the Royal Commission that followed (2010), have made interpreting bushfire risk and deciding how to prepare for them more complicated for residents. Residents who before the Black Saturday bushfires had decided to stay and defend, are now less certain and will instead 'wait and see'. One thing history has taught us is that indecision and last minute plans are often fatal.

The climatic and situational factors in place leading up to February 7, 2009, arguably set up a 'once in a life time' condition that catalysed in the Black Saturday bushfires; the events of which will remain with Australians for years to come. Just how long, and the effect this will have on communities' state of bushfire preparedness, only time and much research will tell. Will those residents who now feel helpless in their ability to mitigate bushfire consequences slowly forget the devastation and come to trust in preparedness measures again? Will those that are now confused as to whether to stay and defend or leave early revert back to previously held beliefs that staying is the safest plan if no major fire event occurs to question their beliefs? If authorities continue to recommend that leaving is the ONLY safe option in the event of a 'catastrophic' bushfire, will they ensure early warning and a local 'identified' safe refuge to all residents? To answer these questions, continued research into the perceptions and decision making process of residents living in bushfire prone areas is required. This information can thus help

develop more appropriate and effective policies and subsequent public education to mitigate negative bushfire consequences.

What does appear to have been a direct consequence of the Black Saturday bushfires and the resultant revamped Bushfire Rating and Warning systems is that people feel confident that the fire authorities are 'doing something'. When asked by the independent research body EMRS (conducting market research on behalf of the Tasmania Fire Service); "With the Tasmania Fire Service implementing a new Fire Danger Rating scale, does it give you confidence that something positive is being done to provide guidance on the potential threat of bushfires?" 91 per cent of respondents (n = 400) indicated that 'yes', they did feel more confident. As will be discussed later in the thesis (see section 9.2.4.), there is often a discrepancy between expert and citizen estimates of risk commonly reflecting the community members' tendency to overestimate the capacity of hazard mitigation measures to reduce or eliminate threat. This cognitive bias (see section 2.6.1) reflects the operation of an interpretive bias known as risk compensation and explains how people maintain a balance between the level of perceived risk and the perceived level of safety proffered by their environment (Adams, 1995).

As such, a perceived increase in extrinsic safety, such as the newly revised bushfire rating and warning system, may decrease perceived risk, evident in Tasmanian residents' increased feeling of confidence in the fire service 'doing something', and reduce their motivation to prepare (Paton, McClure, & Bürgelt, 2006). This same market research report found that over half the respondents still expressed placing 'very high' or 'high' reliance on the Tasmania Fire Service to defend their property during a bushfire, and less than half indicated having a bushfire plan, while only 12 per cent of those who had, had written it down (Enterprise

Marketing and Research Services, 2010). This is consistent with the present study's findings that out of a possible score of 15 on the actual preparedness measures, respondents had on average only adopted a third of the recommended measures (see section 5.3.4). This further emphasises that despite fire agencies' best intentions, their bushfire communication and education initiatives are not effective in increasing community bushfire preparedness.

Similarly, despite agency best intentions, numerous community 'initiatives' and programs have been implemented by fire services over the years but continuation of support and thus long term benefits of these programs are never realised. 'Fireguard', a community engagement initiative introduced by the Tasmania Fire Service in 2000, as introduced in section 3.3.2, was informally terminated three years later arguably due to resource issues, poor design, and lack of formal evaluation. 'Fireguard' thus represents another fire agency initiative set up to support and promote bushfire preparedness of its community members, but was terminated before any long term benefits could be realised (or evaluated). Inadvertently, this has also resulted in residents feeling a certain sense of confidence in being members of an agency-established program (and thus must represent best practice). The problem of course is that as these programs are no longer formally supported by the agency, the preparedness measures advocated 12 years ago may no longer be appropriate or adequate.

Community Fireguard groups, established by the Tasmania Fire Service 12 years ago still function in many communities in some capacity, although these are no longer formally supported by the agency. Therefore, exploring why residents continue to be involved in such groups, what it provides its members, and whether lessons can be learnt from this initiative's past practices, if invaluable information to

designing and implementing more effective community engagement programs. The following section thus presents the key issues identified in the telephone interview data that relate to past and existing Fireguard groups.

8.3.3.2 Existing issues with 'Fireguard'

Community Fireguard was designed to include all the hallmarks of a good community engagement approach (see section 3.3.1). The aim of the program was to provide an opportunity for residents to come together to collectively learn about and problem solve a shared community threat; that being bushfires. The necessary information and resources would be provided by a Tasmania Fire Service facilitator; an expert on bushfire matters, who would over a series of training/information sessions provide these residents with the knowledge they needed to become adequately prepared. In this way, these Fireguard facilitators were providing an empowering setting in which the Fireguard members, through participation, interaction, and collective problem solving could become empowered to collectively sustain this level of bushfire preparedness.

The Fireguard program ceased to be promoted and supported three years after it was initiated by the Tasmania Fire Service (ran from 2000 to 2003). No official reports or records could be obtained from the fire agency to the success (or not) of the program or why it was terminated. Such information was of course not able to be determined from interviews with participants either, however, since Community Fireguard was designed as a community engagement program, with a key outcome being sustainability, evaluation of its success should be able to, to some degree, be determined by still continuing and existing groups.

As such, telephone interview participants who were members of, or had been in the past, of Community Fireguard groups, were invaluable sources of information providing insight into the efficacy of this past community engagement program and whose experiences could help develop more effective future community engagement initiative (see Chapter 9).

Telephone interviews with residents, who were also members of Fireguard groups, indicated that, although there were some exceptions (e.g., Bracken Lane in Fern Tree, and Bramble Street in Ridgeway), most remaining Fireguard groups represented only a telephone tree (list of phone numbers of local residents in a structure so that each person on the tree, once contacted, is responsible for contacting one or several other people to circulate information in the event of a bushfire) and were not actively engaging people in preparations (e.g., group fire pump demonstrations sessions, working bees). Members expressed how a Fireguard group had been set up in their community, or they had joined a group many years ago and that membership was more out of habit than a desire for active participation. Other members expressed how it was really difficult to engage and maintain the interest of its members and as a result 'Fireguard' had become no more than a token phone tree on a piece of paper. Table 33 summarises two of the key issues that were expressed by members during telephone interviews.

Table 33

Problems Associated with Existing Fireguard Groups

Disinterest	'Leadership Fatigue'
No there's less interest, I mean there are more people involved and wanted to be part of it when...it started up, but the group has become smaller and I just don't know why, I really don't know why, there's been changes of personality from the Tiers... (Phoebe from Snug)	Jill's getting a bit, she's getting a bit burned out to use an interesting terminology umm too in trying to organise everything so um, I think she's going to back off a bit now (Jack from Ridgeway)
I suppose we're...happy with what we're doing ourselves, probably a bit sceptical about getting involved in a in a group like that because there's a lot of politics that goes on in Binalong Bay, whilst there's a common cause in bushfire preparedness, people would bring a lot of other baggage with it to that (Tony from Binalong Bay)	...I think there is a, pardon the word, but a bit of 'burn-out' does happen in people who are expected to always be doing the organising and it's not easily volunteered from anyone else you know, people don't just put up their hand too quickly (Murray from Fern Tree)
I don't think people are involved, I think we got a little bit of enthusiasm after Victoria when it was initially started it was really immediately after Victoria and people got all gung-ho but since then...they've gone right off, and we haven't been able to get anyone onboard for those three areas...and in the end, Robert, Betty and I decided that we wouldn't bother like you know, if people don't want to be involved, they don't want to be involved and it's silly, why should we keep um getting upset about it, if they don't want to (Carmen from Middleton)	it's not a lot of work no *[maintain phone trees etc.]*, but it's a matter of you know, I've only got my weekends, my own personal life and when people come and go it's a matter of then going chatting to them you know, the new people in the community and then asking if they want to put their names down blah blah blah, it's a simple thing but umm (Phoebe from Snug)
...some people that are entirely covered by bush (laughs) you know bush everywhere, and they're often the newer people and may not have a concept of you know danger or just think they're going to go and they can't be bothered with anything else so they're just sort of dismissing all the everything else because they're just going to leave, and there's some people who've been here for donkey's years and were here for the '67 bushfires and felt that nothing would help, and they can't be bothered (Prue from Kettering)	*[How's Fireguard going?]* not terribly well...the person up our road passed it on to me … she didn't get much support... I spoke to somebody...in the road who was doing it before that and he said he gave up because of the so many negative comments and negative feelings about it from the people in the road...why I want to do it? Well if we get no response I don't want to do it… (Prue from Kettering)
...well I think everybody is still part of it [Fireguard] but it's never been activated, I think people have still got the phone number or whatever but we never had to use it so, I don't know how enthusiastic anybody is about it...everybody yes has heard it all and until there's sort of a threat, I don't think anybody will do anything, if there's...an immediate threat...I think people will sort of snap to again and start thinking about it, but at the moment I think it's probably the last thing on anyone's mind (Betty from Middleton)	...people aren't really all that interested, people don't respond, you know we had that thing at the fire brigade and hardly any fireguard people came...people don't take it seriously at all...don't put themselves out to support and...Personally, I feel like just giving fireguard a great big miss...I'm just over fireguard and I don't want to do it anymore' (Carmen from Middleton)

What is evident from the extracts presented in Table 33 is that the ‘Fireguard’ template, the way it is interpreted by the residents, is not effective in engaging its members to work together to maintain a high level of preparedness, at least not in the long term (which is required due to the infrequent nature of bushfire). What is unfortunate is that there are members of the community who are willing and have the motivation to drive such bushfire preparedness community groups, but due to the inappropriateness of the ‘Fireguard’ template, the way it was run, lack of support from the rest of the community, or a combination of all of the above, these community leaders are becoming despondent with trying to motivate others to prepare.

Conversations with Community Fireguard leaders highlighted the invaluable resource that these individuals provided. For example, due to many of these residents having resided in the area a long time, they understood the important local issues and through their extensive social networks and ability to acquaint new residents, were able to rally the commitment of other residents to act. The importance of community leaders and the valuable skills they provide has been recognised by other research (Lang, Nelson, & Jakes, 2006).

What seemed to be lacking was a better designed (i.e., bottom up) and supported community group template. As such, consultations with these community leaders and inviting them to take part in the launch of the Tasmania Fire Service Bushfire Ready Communities Tasmania Pilot (Pilot) (action research component of the study presented in Chapter 9) would help ensure that the initiatives that were developed would be supported by and specifically target the needs and capacity of each community.

The seeming issue of this past ‘community engagement program’, Community Fireguard, was that although based on community engagement principles, it was not implemented in a way that reflected these For example, as detailed in section 3.3.2, the program’s outcomes were very much based on quantity of groups established, rather than on the quality and sustainability of these groups. The fact that facilitators were provided with a monetary incentive to establish more groups, further questions the real intentions of this program.

As such, and due to the consistent requests of existing Fireguard members and other community residents participating in the Pilot project to reintroduce and support Community Fireguard, the Tasmania Fire Service Community Development Officer, armed with the data and insights provided from these telephone interviews, developed a new community engagement bushfire group template.

The resultant Bushfire Ready Community group template was based on the community engagement principles of providing groups members with an empowering setting (through the provision of relevant information and resources and providing an avenue for community involvement and problem solving), so that the residents could become empowered themselves to maintain and sustain this collective bushfire preparedness.

Unlike its predecessor, the Bushfire Ready Neighbourhoods template places a greater onus on the members organising, facilitating, and adapting the program to suit their own group’s needs, and as such, would be more sustainable. As such, these groups would be managed by the residents themselves, therefore providing them with a greater sense of ownership and control over their community preparedness. Furthermore, rather than having paid fire service facilitators, trained and supported

volunteer fire brigade members would provide the support and guidance as needed by these groups. In this context, the emphasis of this new 'Fireguard' is very much on quality and sustainability, rather than quantity, thus truly reflecting community engagement principles. This template was only one outcome of the community engagement program initiated by the Tasmania Fire Service. The Bushfire Ready Communities Tasmania Pilot is the focus of the next chapter.

The Tasmania Fire Service (TFS) Bushfire Ready Communities Tasmania Pilot, which represents the action research component of the study, was initiated to engage with communities at risk of bushfire to design initiatives to support its residents becoming better prepared for bushfire. Therefore, the natural first step of the Pilot project was to talk to and engage with residents who were already trying to engage the rest of their community in bushfire preparedness initiatives. Following such consultation the TFS Community Development Officer would be in a better position to design and implement initiatives aimed to promote the communities' residents to better prepare for bushfires. The following chapter presents a summary of the Pilot approach, initiatives, and key findings.

However, before this chapter presenting the qualitative data from interviews with residents concludes, and before this thesis presents the final, action research component of the study, the notion of community, how it is perceived, and how this might affect the community engagement approach, is revisited and explored.

8.4 Revisiting Types of Community

As introduced in section 2.5.6.1, natural hazard literature definitions of ‘community’ are often vague and this introduces problems of comparability across otherwise analogous literature. It was argued at the start of this thesis that it was important to define what ‘type’ of community was being referred to as this has implications for the type of engagement and consequent education programs that are delivered. The fact that natural hazards such as bushfires have specific geographical distributions, and so interact with locations in a geographically specific manner, resulted in ‘community’, for the present study, being defined as comprising a specific geographical locality, whose members share a common culture, interest or value. However, community need not be defined by locality and rather may constitute a group of people connected by a shared feeling of belonging due to maybe a shared experience (e.g., Vietnam veterans) or defined by a shared interest (e.g., Rotary, Country Women’s Association).

Acknowledging that people belong to communities not defined by locality, and may belong to multiple groups has important implications for bushfire and other hazard risk and preparedness communication. Acceptance of the existence of other communities implies that there are a multitude of other avenues for distributing hazard education. To explore whether residents of the targeted four communities identified themselves as belonging to other ‘types’ of communities, not defined by locality, telephone interview transcripts were searched for references to ‘community’. Table 34 provides a summary of these extracts.

Table 34

Residents' Reference to Different 'Types' of Community

Community as locality	Community as a shared sense of belonging	Community as a social network
Umm, as far as I know, I mean the community here is a bit scattered compared to, I'm not in the main part of Binalong, I'm on the other side err basically, (James from Binalong Bay)	Umm, we have a strong community that meets regularly socially so umm I mean all the neighbours sort of meet quite regularly (laughs)...so probably more than once a month we're at someone's house (Ellie from Kettering)	I keep a list of everyone's names and phone numbers umm I call it the Snug Tiers Fire Community (Phoebe from Snug)
I think I realise through...these meetings umm that...the big picture long term solution is community involvement you know so as more and more people get it together, umm then their neighbours can't help but get the bug you know (Cam from Fern Tree)	When we have had those fires, the community reaction in the Lane has been amazing...we all had drinks at our place in the evening and sort of chatted about who'd be around and who would not and who was going and who wasn't (Murray from Fern Tree)	... we try and keep our community fireguard thing going up here but, mainly, I'm hoping other people get interested in driving it up here (Jill from Ridgeway)
...and also we chose this area because it was rural and Adam and I sit very well in a rural community, we don't go out seeking entertainment very much, we're both people who are amused by what we do at home and so that suits us very well (Carmen from Middleton)	Tuesday play group (laughs) (G: Tuesday play group, so we just go around the community shop and play cards and that's brilliant, yeah, a community, and obviously you have a talk there and communicate and yeah, so yeah, it's great) (Sandy and Gus from Fern Tree)	I think, I think it is, yes, we're member of a community fireguard group, 2 community fireguard groups and umm, well you attended that meeting, I think that you saw that it was well prepared...well attended (Brain from Kettering)
I was just having tea and err I can't quite see the house but I could see the smoke go up, yeah and so quite a few people from the community around here just raced down you know, madly panicking just trying to find out where your boots are you know (Jeremy from Binalong Bay, interview 1)	...also us having that sense of community because there's sort of a sense, I don't know, it's just you're not fighting it alone, you know you've got an appreciation of what people are going to do [because of Bushfire Ready Neighbourhood group] rather than on the day having to worry about 'well, are the neighbours alright' you know 'is their dog alright' (Erika from Fern Tree)	...her ears pricked up when we talked about you know the point of having a shared community system [bushfire ready neighbourhood group] so that we can save each other's pets you know, if we're not around and that sort of stuff...(Cam from Fern Tree)

These three different ‘types’ of community (geographic location, shared sense of belonging, and social network) is supported by recent work by Philips et al. (2011) who looked at developing more effective ways of delivering bushfire risk and preparedness communication by addressing different types of community. These researchers cite Blackshaw (2010) and Taylor (2003) in defining three types of community; community as locality, community as a sense of belonging, and community as a social network. These ‘types’ of community and their implications for hazard communication and education is now discussed.

Community as a shared sense of belonging is difficult to define as this ‘community’ is not defined by physical or geographic entities but rather an imagined communal feeling (Anderson, 1983). This definition of community is not dissimilar to the definition and discussion of the psychological sense of community variable included in the Model (Figure 6), implying that people are connected through a feeling of belonging to a commonly identified set of values, ideals, and/or beliefs. As such, sense of community also implies a sense of exclusion, or the existence of *them* and *us*. Phillips et al. (2011) thus warn emergency management policy agencies against appealing to a ‘sense of community’ without appreciating that this will inherently exclude some people, or result in people thinking about very different groups, not all of which may be linked to the geographical area in which the risk is located.

As Blackshaw (2010) and Taylor (2003) described, community as a shared sense of belonging, is made up of members who live a common way of life, share similar ideals or mutual understandings (at least to some degree). As such, it could be argued that this notion of exclusion can be used to great advantage through the notion of ‘positive peer pressure’ (see section 8.3.2). As discussed earlier,

communities (any type) are powerful agents of individual change, as prospective members join to express commonality and feel part of a community of similarly-minded individuals. As such, a community (any type, but particularly the 'sense of belonging' type) who has adopted an appreciation for preparing for bushfires will inherently pass this on to their current and future members, thus maintaining their community norm.

Engaging with and appealing to this kind of community (based on sense of belonging) can therefore be very effective as it can be used to motivate action and spans other geographical boundaries. However, it also implies that depending on the type and size of the demographic that is of research interest, multiple such communities may need to be identified and contacted. Therefore, targeting and tailoring information and education content to such communities represents a challenging but important future direction for hazards research and emergency management agencies alike.

Community as a social network has gained increasing attention in the last decade due to the advancement of technology and dawn of 'social networking' mediums such as Facebook, Twitter, and the World Wide Web. Community as a social network is defined by people who share a connection by a common interest or association such as a religion, ethnic origin, occupation, or sexual orientation. Again, social network communities defy geographical distances and generally have more members than the other types of communities aided in part by advances in technology. Acknowledging the opportunities afforded by this new technology, targeting such communities has become popular with emergency management agencies as delivering their hazard message is much more efficient. However, inadvertently, this has also meant that communicating hazard information and

education has become a lot more complex as all mediums need to now be included to ensure that individuals' preferential information source (e.g., Twitter, Facebook, online news provider) are covered.

Recent examples of the power of social network communities was the use of Facebook pages ('Cyclone Yasi Update and CQ Flood Update) created during the 2011 Queensland cyclone (Taylor, Wells, Howell, & Raphael, 2012) and floods (Bird, Ling, & Haynes, 2012) to provide Queenslanders with instantaneous hazard updates and pool resources to aid in the recovery. This provides an example of the powerful and adaptable nature of social networking communities in responding to natural hazard events. However, as recognised by their creators (Taylor et al., 2012), these social network communities, set up in response to natural hazards are short lived, and usually only survive long enough to see the initial recovery period of the affected communities. As such, the transient nature of these communities result in the invaluable lessons learnt not being carried through for potential future hazard events, and thus do not help to build the resilience of those communities. Similarly, there is a sense that the relative effectiveness of method is a function of residents feeling a shared sense of fate during these natural hazard events. In the absence of an impending disaster, would this method, these social network communities, be effective during the preparedness phase? The potential utility of this method in promoting hazard preparedness and sustained preparedness in communities thus calls for more research into the role of social media during the preparedness phase.

The New South Wales Rural Fire Service's Community Engagement Unit, as detailed in section 3.3.2, have made some headway in attempting to harness this resource to facilitate and promote bushfire preparedness with their Community Engagement Facebook and online blog. These online tools are an endeavour to

develop and support a social network community whose goal it is to engage with local communities to promote bushfire preparedness. Using social network mediums and communities to increase bushfire preparedness thus represents an important future direction of hazards research.

Communities defined by social networks however, are inherently limited by socio-economic status and limited access to technology (e.g., mobile reception, high-speed internet access) such as in rural and remote areas (e.g., many Tasmanian towns). For example, according to Telstra, the main telecommunication provider to the state, the National Broadband Network, a $36 billion Federal Government initiative to provide high-speed broadband internet to regional Australia, is not currently available in Tasmania (Telstra, 2012). Furthermore, although such communities can provide emotional and even material support to its members, the communities' ability to deal with structure-level problems is often limited due in part to the often geographically diverse distribution of its members.

The underlying common thread of this thesis, the importance of developing a community's (specifically locality) capacity to deal with hazards and grow resilient to them, has been internationally recognised (de Terte et al., 2009; Handmer & Choong, 2006; Maguire & Hagan, 2007; Mileti, 1999; Paton, 2006; Pritchard & Gow, 2008; Tobin & Whiteford, 2002). This is owing to the fact that the complex matrix that is community, consisting of neighbourhoods, families, churches, services, and hobby clubs, and other civil society organisations, provide one of the most important mechanisms through which individuals organise their activities, circumscribe their identities, and muster resources. By virtue of belonging to particular community, whether defined by locality, sense of belonging, or social network, individuals can manipulate (increase or decrease) their vulnerability or

resiliency to a mirage of potential natural or society constructed hazards (Murphy, 2007).

Therefore, regardless of whether the goal is to increase preparedness or efficacy of response, emergency management policy must fundamentally rest on the ethos of engaging with people to develop and support strong, capable communities. As such, the rationale for encouraging emergency management agencies to adopt a community engagement approach to preparedness education is based on the belief that it will contribute to the development of resilient and sustainable communities. Communities that are resilient have the capacity to utilise internal strengths and resources to limit the negative consequences of hazards and disasters, and their aftermath (Paton & Johnston, 2001).

8.4.1.1 Belonging to a 'community' as a motivational force for change

The finding that residents defined 'community' in these three different ways is consistent with research conducted by Blackshaw (2010), Taylor (2003), and Phillips et al. (2011). However, community was not only described as something to belong to but also a way of being, a social and psychological orientation. These residents explained that their reason for being involved in various community activities was because they felt a 'wider sense of community' and need to contribute to something other than themselves. Table 35 provides telephone interview participants' references to this apparent personal attribute.

Table 35

Residents' References to 'Sense of Community' as a Personal Attribute

I don't know if I was particularly community oriented while I was in [the Scouts] (laughs) on purpose (laughs) but...there's a certain level of err self-motivation and proactive and sort of independent responsibility that I feel, I think...that had a lot to do with [preparing for bushfires]... (Cam from Fern Tree, interview 1)
I did a volunteer day a week in [a] nursing home where I went in and massaged people's feet and that's my contribution to the community...so this [being Fireguard liaison person] is my way of doing something in the community, and if I wasn't doing that I'd be doing Meals-on-Wheels or something... (Carmen from Middleton, interview 1)
...so I think that he thinks that it's something that needs to be done for the wider community...and you get off your bum and you do it...I think that's what it's about, I mean you're just talking about people who have a wider sense of community... (Carmen from Middleton, interview 2)
It is a bit weird because a lot of people are very community oriented up there you know, and there's Bushcare and there's the fire brigade itself and all sorts of other things, the Community Centre that I'm a bit, and Fireguard's the only one I really do...maybe I'm a bit weird, I'm not an overly sociable person, I'm quite happy in my own space (Murray from Fern Tree, interview 1)
We don't feel like we're by ourselves...even so people...weren't particularly interested in that Fireguard thing they're still quite community minded and...you know you wouldn't be on your own completely (Rosie from Gordon, interview 1)
[Phoebe, are you involved in any other community groups in the area or wider Hobart?] Umm, no...I'm not...I'm a teacher so I'm involved in other groups (chuckles) sort of like yes, my whole community is out there (laughs) so I'm involved totally with people (Phoebe from Snug, interview 2)

This 'personal attribute' could also be interpreted as a 'psychological sense of community', such as that portrayed in the Social Attachment Model of Bushfire Preparedness presented in Chapter Six (Figure 6). This finding therefore supports the Model which explains that psychological sense of community (residents' feeling of belonging, the feeling of being important to each other, and a shared belief that residents' needs will be met by their commitment to each other), predicts community

involvement, which in turn predicts the adoption of bushfire preparedness measures. This finding also provides further justification for only including the psychological dimension of sense of community (and removing ‘neighbouring’ and ‘attraction’) in the revised Social Attachment Model of Bushfire Preparedness.

This finding further reinforces the present study’s position of the fundamental influence of the social environment and strong motivational influence of fellow community members on individuals’ interpretation of risk communication and decision to adopt preparedness measures, however community is defined. It therefore becomes evident that the most effective way of promoting sustained and effective bushfire preparedness behaviour, is to facilitate community members to influence each other. This very notion is the objective of the community engagement approach; working with the community to empower them to facilitate positive change within their own community.

Taking this as a starting point, the goal of the Tasmania Fire Service Bushfire Ready Communities Tasmania Pilot was to develop and facilitate initiatives that were managed by the communities themselves, thus ensuring that the diversity of communities, as illustrated in Table 34 above was accounted for. Furthermore, by only facilitating these initiatives and allowing community members to manage them themselves, it would ensure that the purpose, promoting bushfire preparedness, would extend and be maintained throughout the whole community. The following chapter therefore presents a summary of how the Tasmania Fire Service Bushfire Ready Communities Tasmania Pilot, through community engagement, empowered residents of four communities to become more prepared for bushfires.

Chapter Nine – Application of Theory to Practice through Action Research

9.1 The Tasmania Fire Service and University of Tasmania Collaboration

As the purpose of action research is to produce useful results to make positive changes (Westhues et al., 2011), the results of the quantitative (Chapters 6 and 7) and qualitative (Chapter 8) components of the present research were integrated to inform the development of a program to promote community bushfire preparedness. This task was adopted by Tasmania Fire Service Community Development Officer in collaboration with the researcher (discussed presently). As such, the proposed Bushfire Ready Communities Tasmania Pilot was founded on the factors demonstrated by the Social Attachment Model of Bushfire Preparedness to promote community bushfire preparedness. The Model (Figure 6) demonstrates how individual and social factors (e.g., place attachment, personal responsibility, psychological sense of community, community involvement) interact with people's beliefs about their relationship with sources of information to influence how people make decisions about actual preparedness. The validity of the role played by the variables identified in the Model in this regard was reinforced by the interview data presented in Chapter Eight. Interview analysis provided confirmation of the influential role of residents' social networks (including family, friends, and community volunteer fire fighters) in defining community narratives, providing relevant information, reinforcing community norms (positive peer pressure) of preparing for bushfire, and enhancing the likelihood that people would accept responsibility in ways that facilitated formulating intentions to prepare.

Recognition of this prompts asking how such concepts can be practically and realistically applied by agencies and communities to effectively promote bushfire preparedness. This has so far not been well established in the literature.

Consequently, research into how communities and agencies can be engaged in reciprocal and complementary ways is required (Kumagai, Bliss, Daniels, & Carroll, 2004; McCaffrey, 2004; McGee & Russell, 2003; Paton & Wright, 2008; Winter, Vogt, & McCaffrey, 2004) and is the purpose of this final component of the present study.

The focus of this chapter is on discussing how to facilitate the application of the theoretical understanding derived from the analyses to the practical task of promoting sustained bushfire preparedness. This was achieved through the collaboration of the researcher with the Tasmania Fire Service to develop a community engagement program. The following is thus an exploration of the methodology and results of the Tasmania Fire Service's Bushfire Ready Communities Tasmania Pilot program.

At the same time as the Doctoral research on bushfire preparedness commenced, the Tasmania Fire Service (TFS) introduced the Bushfire Ready Communities Tasmania Pilot program and appointed a Community Development Officer. This provided an invaluable opportunity for the researcher and fire agency to collaborate and use the theoretical Model to inform the development of a new and therefore evidence-based intervention program. The evaluation (conducted by the University of Tasmania researcher) employed an action research approach to enable the Community Development Officer to tailor and progressively develop the engagement process to accommodate the findings of the evaluation.

9.2 Tasmania Fire Service Bushfire Ready Communities Tasmania Pilot

As a result of the progressive 'paradigm shift' from top-down information provision to community engagement, and as a means of complementing the effective

three-year *Bushfire: Prepare to Survive* awareness campaign (Enterprise Marketing and Research Services, 2010), the Tasmania Fire Service (TFS) introduced the Bushfire Ready Communities Tasmania Pilot program and appointed a Community Development Officer in March 2009 to trial and evaluate a new evidence-based intervention program. Therefore, although the nature of the Pilot, actively engaging with and empowering communities, is supported by the recommendations of the Final Report of the 2009 Victorian Bushfires Royal Commission (2010) it was not a 'knee-jerk' reaction to the Black Saturday fires of February, 2009.

The aim of the Pilot was to identify how to mobilise and or develop existing community resources to empower communities and support their members to take collective responsibility for their own risk management and to identify how these processes influenced levels of bushfire preparedness. It was therefore important that each community was treated as unique to ensure that their individual strengths and weaknesses were accommodated in the intervention process. This permitted the Pilot to identify inherent community characteristics and competencies and their influence on hindering or facilitating preparedness actions.

9.2.1 Target areas

Through consultation with TFS managers and District Officers (who are responsible for Operational Districts within the three regions of Tasmania), four communities were chosen for the Pilot project. Communities chosen were all deemed at risk of bushfire by the TFS but were also chosen based on other criteria to ensure the greatest variance in the communities and thus greater generalisability of results to the wider community. The communities consisted of one northern rural community, one urban interface, two southern rural, a community with a recent major bushfire experience that impacted on the community, as well as accounting for a variety of

other factors such as various types of vegetation, demographics, and degree of existing connectedness in the community. The four communities were Fern Tree, Binalong Bay, Huntingdon Tiers in Bagdad, and Snug Tiers, and thus represent the same communities that provided the questionnaire and telephone interview data (Chapter 5 and 8 respectively) (see Figure 7 or Figure 3).

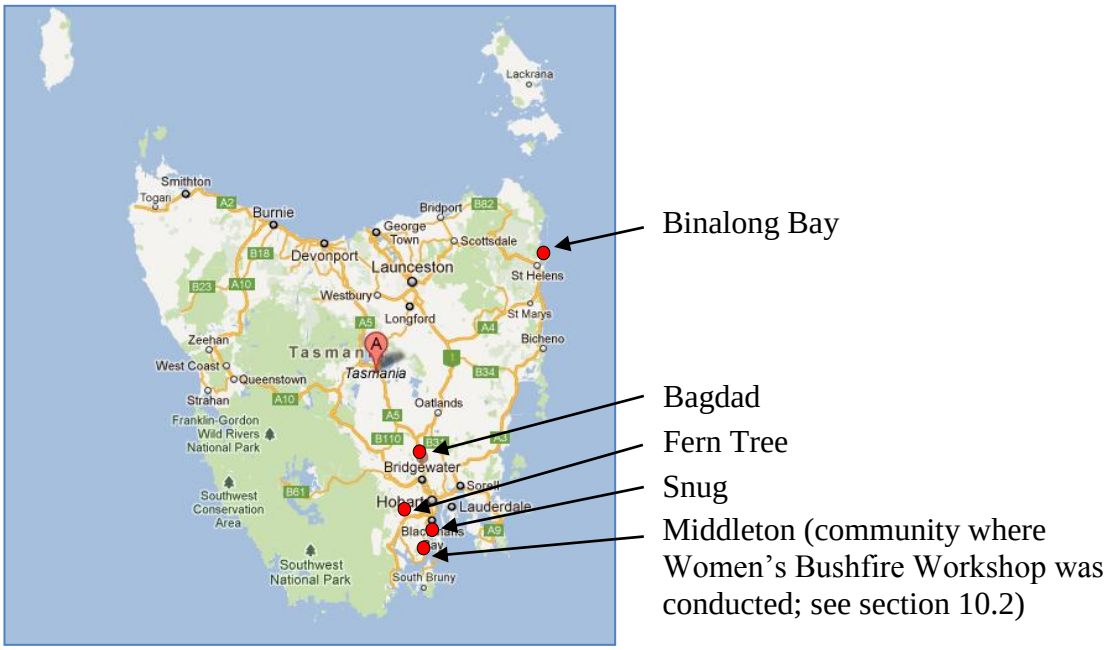

Figure 7. Location of Tasmanian communities engaged in the Tasmania Fire Service Bushfire Ready Communities Tasmania Pilot (Tele Atlas, 2012).

9.2.2 Consultation

As the aim of the Pilot project was to increase bushfire preparedness of communities by engaging with their residents and develop initiatives with their input so as to help empower them to adopt and sustain these behaviours, it was fundamental to first establish whether such a process was/had already been established by their local volunteer fire brigade. If this was the case, which would represent the most desired situation as the principles of community engagement and

empowerment were already a part of the brigade/community bushfire preparedness relationship, then the Pilot would support the brigade in any further initiatives they wanted to (but maybe could not due to funds, time restraints etc.) introduce. If, however, the brigade did not have an established culture of community engagement, one of the Pilot's aims was to act as a liaison between the brigade and its community through the organisation of community bushfire preparedness initiatives.

Therefore, the local volunteer fire brigades of each of the four target communities were consulted at the beginning of the Pilot to gain an insight into their existing level of engagement with their community; their capacity for community liaison and education; awareness of their community's preparedness, capacity and vulnerability; local knowledge of key community leaders and groups; and, to gain their support for the project.

All four brigades agreed to support the Pilot although it was apparent that their capacity and attitude toward a community development approach to bushfire preparedness varied. Whilst some brigades (e.g., Fern Tree) indicated there was already a strong culture of engagement with their community and that promoting community preparedness was integral to their volunteering operations, other brigades indicated their community involvement was limited through lack of volunteer numbers or reflected an existing cultural attitude that their role as volunteers was 'to put the wet stuff on the hot stuff' (a common anecdotal quip made by residents).

Post-meeting surveys (see Appendix K) however, indicated that 41 out of the 42 volunteer fire brigade members surveyed believed that encouraging community-brigade engagement was beneficial to increasing bushfire preparedness and enhancing their ability to assist the preparedness goals of communities. Reasons

given included increased awareness, increased preparedness, increased understanding of roles and responsibility of volunteer fire brigade and community members, and the notion of 'help us to help them'. Thus, the community engagement approach provided a platform to help meet the Commission's (2010) objective of promoting bushfire risk management as a 'shared responsibility.'

All 42 volunteer fire brigade members (across all areas) surveyed agreed that conducting meetings with both community members and volunteer fire brigades to develop a better understanding of bushfire preparedness was beneficial. Reasons given included more involvement from both parties, promotion of understanding/discussion between both sides, "[volunteer fire brigade] are a part of the community so work together to save property and lives", and "[volunteer fire brigade] should listen to community, but TFS also need to listen to [volunteer fire brigades]". Volunteer fire brigades who were not very actively engaged with their community suggest that this was due to a lack of resources and disinterest from the community; a finding that reinforces the value of promoting active community participation in the risk management process. In other words, volunteer fire brigades may have to be encouraged to engage with their communities, and thus develop this competency, independently of the provision of information in order to increase the likelihood of information being used to assist preparing (Paton & Wright, 2008). Such engagement activities could include running the barbeque at the local school fair or doing a Santa run (throwing lollies to children from the fire truck during Christmas time)

Feedback from volunteer fire brigade members identified the benefit of having a community liaison officer within their brigade. Members also expressed that this role should be adopted by an existing member, one experienced in fire

fighting, and potentially one who no longer wanted to be an active fire fighting member but still wanted to be a member of the volunteer fire brigade and contribute to benefiting their community. The idea that a community member could be especially recruited to undertake this role was therefore not generally supported. However, it was unanimously agreed that it was essential that such a position was filled by a brigade volunteer who was also an existing community member; that is, someone who was familiar with the area and its community members. The importance of having community-based leadership of this kind is supported by findings from other studies (McGee & Russell, 2003).

Local Government and other agencies (e.g., Parks and Wildlife, Forestry, Wellington Park Management Trust) that were affiliated with the target communities, and represented significant landowners in the target areas, were also approached for consultation and project support. 'Community leaders', community members identified by either the volunteer fire brigade or other local agencies as being influential members of their communities, were also consulted about the Pilot and their support sought so that they might spread the word and their support for the Pilot throughout the community, thus increasing the likelihood of wider community acceptance. Table 36 below provides a summary of the consultation meetings with key community leaders and agencies.

Table 36

Tasmania Fire Service Pilot Consultation Timeline

Bagdad	–	Meeting with Bagdad fire chief (24/6/09)*
	–	Meeting with President of Bagdad Community Club (1/7/09)*
	–	Meeting with TFS District and First Officer (1/7/09)*
	–	Meeting with Bagdad Fire Brigade (9/9/09)*
	–	Meeting with TFS District Officer to discuss activities to be held in 2010/11. Agreed to plan for up to 3 field days and to expand Pilot to include East Bagdad Rd (9/9/10)
Binalong Bay	–	Meeting with Community Development Officer and Natural Resource Management Officer of Break 'O' Day Council (16/7/09)*
	–	Meeting with Rotary Club/Binalong Bay fire brigade member (17/7/09)*
	–	Meeting with President and Secretary of Rate Payers Association (17/7/09)*
	–	Meeting with Binalong Bay fire brigade (August, 2010)
	–	Meeting with Binalong Bay Rate Payers (17/1/10)*
	–	Meeting with new Binalong Bay Rate Payers committee (18/11/10)*
Fern Tree	–	Meeting with President of Fern Tree Community Association (4/6/09)
	–	Meeting with Fern Tree fire brigade (10/6/09)*
	–	Meeting with Bracken Lane Fireguard group (28/11/09)*
	–	Meeting with new Community Engagement Officer of Fern Tree fire brigade to discuss refinement of Bushfire Survival Plan template (25/8/10)
Snug	–	Meeting with Snug fire chief (16/5/09)
	–	Meeting with Channel Heritage Museum volunteer/community leader (25/6/09)
	–	Meeting with Snug fire brigade (24/6/09)*
	–	Meeting with local Councillor (30/6/09)*
	–	Meeting with female member of Snug fire brigade (30/6/09)*
	–	Meeting with Community Development Officer (7/7/09)
	–	Meeting with neighbouring fire brigade (Margate Fire Brigade: 5/8/09)
	–	Meeting with Snug Brigade, discussed potential appointment of community liaison person within brigade (17/11/10)

Note: Meetings marked with asterisk were also attended by the researcher.

Consultation with key community players (e.g., community leaders, volunteer fire brigade, local council etc.) was integral to the development and

progression of the Pilot. These consultations dictated the way the TFS Community Development Officer approached each of the target communities to ensure that the initiatives developed would meet the needs of that particular community, and more importantly to ensure sustained bushfire preparedness behaviour, and that the Pilot's initiatives were supported by the community. The following sections therefore outline the two major phases of the Pilot's engagement in each community. The first Phase focused on information provision (empowering setting) and promotion of the Pilot in each community. The second Phase incorporated the individual community engagement initiatives developed and conducted through active involvement of the target communities' residents (empowering people). A summary of the process, activities, and findings from each Phase now follows.

9.2.3 Phase 1 community engagement

Through consultation with the various key players in each of the communities all four communities decided that an interactive information session (henceforth 'Forum') about bushfire preparation in their local community, with an avenue for locals to be able to ask questions of the agency representatives, would be the most effective way to introduce the Pilot and provide bushfire preparedness advice to the communities' residents. Promotion of the Forums was largely organised by the Community Development Officer although, where possible, the local volunteer fire brigade and/or other community members were encouraged to promote the Forum as much as they were comfortable with. The District Officers responsible for each of the communities agreed to provide the expert bushfire advice at each Forum. Therefore, due to the resource availability and unique circumstances of each community, each Forum format and content varied slightly, as did the community concerns in each area. This highlights (and addresses) one of the

problems with using top-down, mass media risk communication. It is difficult for the latter to accommodate this diversity (Paton & Wright, 2008).

Binalong Bay. The Binalong Bay Forum was held on Sunday the 13th of September, 2009 at the Binalong Bay Fire Station. As well as the District Officer and Binalong Bay volunteer fire brigade being in attendance to provide advice and fire pump demonstrations, a number of St Helens (neighbouring community) volunteer fire brigade members also attended to provide support. Representatives from Parks and Wildlife, Forestry, and local government officers, including the Community Development Officer, Natural Resource Management Officer and General Manager, also gave short presentations following the main presentation by the District Officer. All presenters participated in the Question and Answer session at the end of the Forum. In total, 45 community members and approximately 20 volunteer fire brigade members and representatives attended the Forum. The Forum was followed by a barbeque lunch catered by the St Helens Lions Club (organised by the Community Development Officer) and an opportunity to speak with the various representatives more informally.

Snug Tiers. The Snug Forum was held on Sunday the 18th of October, 2009 at the Snug Memorial Hall. Again, the main presentation was given by the District Officer but presentations were also given by a Parks and Wildlife representative and a Community Fireguard group leader from Kettering (a neighbouring township). A Question and Answer panel following the presentations also consisted of representatives from local government (a Councillor, Development Officer, Planning Officer, and Bushfire Care Officer). Seven members from the Snug and Margate (neighbouring community) volunteer fire brigades also attended and a display of fire fighting products from TasFire Equipment was set up for residents to view.

Approximately 45 people attended the Forum, of which 15 were representatives, presenters, or volunteer fire brigade members. The Forum was concluded with a barbeque and opportunity for informal discussion with the various representatives.

Fern Tree. The Fern Tree Forum was held on Sunday the 1st of November, 2009, in the Fern Tree Hall. As the Fern Tree volunteer fire brigade is very active in the community, a 'Forum' had already been prearranged to take place and therefore the TFS Community Development Officer offered support by promoting (e.g., personal invitations to residents, posters, etc.) and catering (barbeque, tea, coffee, and biscuits) for the Forum. Approximately 120 community members attended the Forum. At the conclusion of the main presentations, residents were provided the opportunity to ask questions of a panel of representatives from the TFS, local government, and members of local Community Fireguard groups. After the Question and Answer session, residents were given the opportunity to see fire pump demonstrations and engage in further discussion with TFS members and other representatives over a barbeque lunch.

Huntingdon Tiers, Bagdad. The Bagdad Forum was held on Sunday the 15th of November, 2009, at the Bagdad Community Club. The District Officer, General Manager of local council, and local police officer gave presentations, and members and young cadets of the local Bagdad volunteer fire brigade gave a demonstration of fire pumps. In total, 11 community members, 10 volunteer fire brigade members, and six other representatives attended the Forum. The Forum was concluded with a barbeque lunch prepared by the local volunteer fire brigade.

9.2.3.1 Phase 1 findings

Forum evaluation surveys (see Appendix 1) were distributed to residents who attended the community Forums. In total, 77 community members completed surveys (approximately 40 per cent of those who attended Forums). Surveys included questions that gauged community members' views on the format of the Forum itself, as well as perceptions of bushfire preparedness, benefits of attending Forums, and roles and responsibilities of residents and fire agencies. Overall, all communities agreed that the Forums were well organised, enjoyable, made them re-evaluate their own bushfire risk, and that they had a better understanding of who to contact with specific bushfire questions as a result of attending the Forum.

When asked what they learnt from the Forum, five main themes emerged including:

- that bushfire management is a complex issue and that there is a lot of background work by agencies that goes on to manage it;
- the planning involved to prepare for bushfire;
- the various recommended preparedness measures; new information (e.g., Fire Danger Rating); and,
- actual fire behaviour.

The residents in the target areas indicated that they would have liked to have learnt more about specific home fire protection, specific information regarding the TFS (e.g., membership, junior cadet program), and whether there was an evacuation plan for their area or where to go if they had to leave their property. In response to this expressed need, the Forum not only provided information about bushfire and preparedness to community members, but also, just as importantly, allowed them to identify what information they did not have, initiating the first step in the problem-

focused coping/problem solving process. The Forum therefore acted as a process of eliciting the community members' needs; highlighting the issues and questions they had not yet had addressed by the fire agencies, and provided invaluable feedback for the Pilot process and future community initiatives. Of note was the finding that 71 out of the 77 residents indicated that they intended to become more prepared for bushfire as a result of attending the Forum.

Furthermore, some 40 per cent of residents indicated that their perception of their own and their volunteer fire brigade's roles and responsibilities had changed as a result of attending the Forum, facilitating an understanding that the volunteer fire brigade have limited resources and that the home owner is largely responsible for their own preparation. For those residents that indicated 'no', their perceptions of roles and responsibilities had not changed as a result of attending the Forum, many explained that this was because they were already aware of these roles and responsibilities.

The most commonly listed benefits of attending the Forum were to acquire more information about bushfires and how to prepare for them, understanding that community preparedness is/can/should be a community responsibility, and motivation to start preparing now (which was itself stimulated by discussing bushfire issues in a social setting). This process facilitates preparedness being seen as a collaborative activity, increases the likelihood of people continuing to discuss bushfire preparedness in everyday life, identifies future needs, and increases the likelihood of preparedness becoming a social norm (McGee & Russell, 2003; Paton, Bürgelt, et al., 2008; Paton & Wright, 2008).

> ...yes, we've probably done more of it [bushfire mitigation activities] this year than we have in the past, umm we've taken out a couple of trees that we've left in the past umm but err like there's a lovely big tree growing up against our um shed... we took that tree away, um and it's been growing there for a long time, and it looks lovely, we were really sad when we took it down but err so we've made a few decisions this year, probably based on doing that Forum that we that we wouldn't have otherwise...and there are others [trees] that we are contemplating taking out um because, that we wouldn't have before (before the Forum?) yes... (Ruby from Bagdad, 12/01/10)

When asked how the Forum could be improved the most common answers were:

- better attendance from other community members;
- more specific information about how to prepare their properties; evacuation procedures in their community; and,
- longer question time.

The final response point highlights the important role that discussion amongst community members and questions of trusted expert sources plays in developing risk beliefs and deciding to implement protective measures (Paton, Bürgelt, et al., 2008).

9.2.4 Disparity between volunteer fire brigade and residents' beliefs

Fire agency sources, who design and implement risk communication programs, derive their judgements about fire risk from relatively objective assessments of likelihood of occurrence and consequence. Community members' interpretation of risk may not share the relative objectivity that characterises expert analysis (Bushnell, Balcombe, & Cottrell, 2007; Paton, McClure, et al., 2006; Sjoberg, 1999). Instead, their interpretation of and response to risk is determined not only by expert information about risk, but also in the way this information relates to other institutional, political, cultural, social, and individual processes. Reasons why

residents' perception of risk can differ from their fire agency counterparts were explored in the discussion of cognitive biases in section 2.6.1.1.

One of the cognitive biases discussed, an interpretive bias known as risk compensation, was evident when comparison of community members' interpretation of their own perceived level of bushfire awareness and preparedness was compared to how their local volunteer fire brigade rated the community's level of awareness and preparedness. The following presents the results of the comparison between these two fundamental components of a community and their perception of the residents' bushfire awareness and preparedness.

Community responses to the Forum evaluation survey on their perception of their community's bushfire awareness and preparedness were compared to the local volunteer fire brigades' (VFB) perception. A total of 66 community members and 40 VFB members provided data. There was a significant difference between community members' and VFB members' perception of the community's bushfire awareness ($t(104) = 3.14$, $p < .05$) and preparedness ($t(103) = 5.32$, $p < .001$) independent of locality break down (locality comparison was not possible due to small and unequal sample sizes). Due to the unequal samples, Levene's equal variances not assumed are reported.

To determine if there were significant differences between community member ratings of their community's bushfire awareness and preparedness compared to their local brigade's, one way analysis of variances were conducted. The highest mean rating for community bushfire awareness was given by both the Fern Tree residents and their VFB. The community rating their perceived preparedness as the highest was the Binalong Bay residents, with Fern Tree VFB

giving their community the highest bushfire preparedness rating. Table 37 shows which communities' residents and VFB perception of the community's bushfire awareness and preparedness differed significantly.

Table 37

ANOVA Results of Comparison between Community Residents' and VFB Members' Perception of Community Bushfire Awareness and Preparedness

		Awareness		Preparedness	
Community	Participants	(*m*)	Sig.	(*m*)	Sig.
Binalong Bay					
	Community	3.55		3.86	
	VFB	2.33	*p <.05	2.00	*p < .01
Bagdad					
	Community	2.44		3.67	
	VFB	3.08		2.83	*p < .05
Fern Tree					
	Community	4.14		3.51	
	VFB	4.00		3.00	
Snug					
	Community	3.00		3.37	
	VFB	2.33		2.33	* p < .05

Note: VFB = Volunteer fire brigade, Sig. = significant difference, *m* = mean

As shown in Table 37, the communities' perception of their bushfire awareness and the VFB perception did not differ significantly except for the community of Binalong Bay. Communities' and the VFBs' perception of the community's bushfire preparedness was significantly different in every community except for Fern Tree. In all cases where there was a significant difference, the VFB

reported lower (perceived) means except for Bagdad fire brigade's perception of their community's bushfire awareness.

The disparity between volunteer fire brigade and community members' perceptions of fire issues was also explored by Bushnell, Balcombe, and Cottrell (2007) in their mixed-method case study of the Tamborine Mountain community of southeast Queensland, Australia. These authors similarly found that residents' bushfire awareness was perceived to be lower by the fire service than actually reported by the community members themselves. Although the fire service accurately predicted that community members had low bushfire risk perception (62% disagreed with statement "I think about the risks of fire here every day", they attributed this to their lack of bushfire awareness. This however, was not the case, with 79 per cent of participants (n = 155) indicating that they did in fact think about bushfire risk. Despite this professed awareness, residents indicated that other personal, family, health, and home and environment concerns took priority over perceived bushfire risk concerns.

What Bushnell et al.'s (2007) study and the present study's findings demonstrate is that there are both similarities and disparities in perceptions of community bushfire issues between the fire service and the community. However, while the fire services often recognise the issues within the community, their understanding of residents' interpretation of these issues is often flawed. It is thus important that fire services understand these processes in order to develop and deliver more effect risk communication and bushfire preparedness education.

To ensure the best bushfire preparedness outcomes, it is pertinent that expert and citizen estimates of risk are congruent. Who is more correct is not really important,

rather that these two integral components of community bushfire safety are on the same page is the important thing. This can be achieved by actively involving community residents in decision making about acceptable levels of risk and the strategies that can be used to mitigate this risk. In other words, greater levels of community engagement on the part of the fire agencies, thus ensuring that accurate information is provided in a meaningful and non-threatening way will go a long way to ensuring that fire agencies and their communities have realistic expectations of each other.

9.2.4.1 Discussion

The TFS Community Development Officer used these community bushfire Forums to introduce the Bushfire Ready Communities Tasmania Pilot and asked the residents what, if any, support they would like from the TFS to become more prepared for bushfires. The next step for the Community Development Officer was to engage with those community members that wished to be more proactive about preparing for bushfires and/or needed more tailored TFS support to accomplish this.

9.2.5 Phase 2 community engagement

Table 38 below provides a summary of the community initiatives developed following the Forums in each of the four target communities. Activities which were also attended by the researcher are indicated with an asterisk. Details of activities not attended by the researcher herself were obtained from the attending TFS Community Development Officer or through correspondence with the participating TFS District Officer or brigade fire chief.

Table 38

TFS Pilot Phase One and Two Activities Timeline

Bagdad	–	Community Forum (15/11/09)*
	–	House assessments by brigade Chief; 1x resident who attended Forum; 1x neighbour of participating resident
	–	Field Day - 5 properties assessed (15/11/09)
	–	Field Day – 6 properties assessed (30/10/10)*
Binalong Bay	–	Community Forum (13/9/09)* (House assessment conducted by District Officer as a result of Forum)
	–	Focus group (31/9/09)
	–	Field Day - 3 properties assessed (1/10/09)*
	–	Field Day - 5 properties assessed (18/1/10)*
Fern Tree	–	Community Forum (1/11/09)*
	–	TFS Community Development Officer gave presentation regarding the Pilot to the Binalong Bay Rate Payers AGM (17/1/10)
	–	Field Day - 6 properties assessed (18/1/10
Snug	–	Community Forum (18/10/09) * (TFS Community Development Officer and Snug fire chief conducted house assessment; 3 other requests for house assessments as a result of the Forum)
	–	Field Day – 5 properties assessed (13/3/10)

Binalong Bay. Following the community Forum the Community Development Officer and District Officer met with four community members on the 30th of September, 2009, in a focus group format to discuss more specific bushfire issues concerning the Binalong Bay hamlet and surrounding bushland properties. The type of information that was sought from the District Officer by the group was very specific to the area (e.g., highest risk areas, likely bushfire behaviour in the area) and what specific actions they should take to mitigate risk on their property.

The focus group discussion between the four community members and the District Officer was concluded after two and a half hours (but could have lasted

much longer, so many questions did the residents have) and following the request from the residents, three property inspections by the District Officer took place the next day. Nine residents in total attended these property inspections and indicated how useful and valuable they were as it offered detailed, specific, and contextual information about how to prepare their homes that could not have been obtained from bushfire literature or other education formats such as the Forum. Inspections, particularly those conducted in response to community requests, have been found by other research to be good predictors of the adoption of protective measures (Martin et al., 2007).

In addition to receiving much positive feedback about the format of these community property assessments from community residents, the District Officer also endorsed the format explaining that the format was much more economical and less resource taxing than individual property assessment (where only household members attend) since the community property assessments offered a larger number of residents greater access to specific and contextual information about how to prepare themselves and their homes for bushfire.

The residents and the District Officer also commented on the benefit of the community members being able to discuss and share information about bushfire related matters with each other as well as generally developing community networks. Furthermore, the ability of residents to compare their own perceptions of what constitutes being a prepared property, with a real physical example reduces the chance of cognitive biases (e.g., normalisation bias) inhibiting further adoption of measures.

This ‘field day’ format also provides an alternative to the passive dissemination of information, which, as discussed in section 8.3.1.4, may result in residents incorrectly confirming that the preparedness measures they have adopted are adequate, or alternatively, not participating in community education events because they believe they already have the information.

As a result of this success, the Community Development Officer organised a larger community Field Day, held on the 18th of January, 2010. A bus commuted participating local residents to five properties where the District Officer provided bushfire risk assessments and advice on how to better prepare properties. Eighteen local residents participated. At the fourth property the home owner kindly put on tea and coffee allowing residents to network and discuss bushfire matters informally.

Interviews with participating residents (n = 5) at the completion of the Field Day indicated that they found it to be a very informative and worthwhile event. For example;

> *Example 1* – “[*Overall impressions?*] Very good, very informing. I’m a newcomer to Binalong Bay and I’m really impressed with how the firie (sic) taught us a lot of things that I knew nothing about yes. [*Any improvements?*] No, well I’ve got to learn all these things, but at least I’ve learned a lot more about what I’ve got to do with my property and I will join the fire brigade and err cause everyone should be helping each other...”

> *Example 2* – “[*Overall impressions?*] Very informative...I can see I’ve got work to do, and I appreciate that. I knew most of it anyway, but it just exacerbates...it’s causing me (sic) actions to be done quicker than they would normally have been done...”

As only approximately 32 per cent of the homes in Binalong Bay are occupied by permanent residents (ABS, 2008), a challenge for the Community Development Officer was to engage the transient community (e.g., shack owners, campers, tourists). After consultation with the new Committee of the Binalong Bay Rate Payers Association in November, 2010, they suggested that another Forum should be held to engage a larger proportion of the Binalong Bay community during the Christmas holiday period in January, 2011. As well as changing the time of year the Forum was offered, it was hoped that word-of-mouth relating to the success/benefit of the last Forum and Field Days would encourage a greater number of residents to attend. This Forum however, was cancelled due to severe flooding in the area.

Snug. Residents who had attended the Snug Forum in October 2009 had raised concerns about excess vegetation along the narrow no-through road verges and the process for removal of vegetation on private property. Based on these concerns, the Community Development Officer organised for the local council's hazard reduction officer to attend a field day which was held on 13th March, 2010. Five property owners volunteered their properties for assessment by the TFS Field Officer and 17 people attended the Field Day. The presence of the local government officer was well-received as she was able to provide detailed explanations of the hazard reduction processes and how to comply with Council's by-laws. One of the main benefits of the event was the networking between neighbours. This resulted in a follow-up request from seven property owners from one of the most at-risk roads to establish a bushfire telephone tree. Ten participants completed Field Day feedback sheets (see Appendix J). Comments included:

> *Example 1 –* "[O*verall impressions?]* Practical advice on fire preparation. Increased knowledge about the reality we might face. Made good connections/contact with local community. Excellent day."

> *Example 2 –* "[*Overall impressions?*] Very impressive, very good advice, facilitated community engagement and responsibility, should be continued and funded indefinitely."

> *Example 3 –* "[O*verall impressions?*] Knowledge of community leading to a fire group hopefully. Different properties' fire plans. Good having Council input as well."

The Snug volunteer fire brigade has since decided, through the developments of the Pilot, and with the support of the Community Development Officer, to appoint a Community Engagement Officer within their brigade (discussed in more detail below). This appointment has coincided with the acknowledgement by TFS that volunteer fire brigades should consider expanding their membership to include non-fire-ground volunteers. This new Community Engagement Officer is a female resident recruited from the Snug community and who has no prior involvement with the brigade. This represents a positive step in shifting the volunteer fire brigade's traditional culture of a predominantly curative model to a more preventative model, with a focus on encouraging community engagement to foster the adoption of greater bushfire preparedness measures.

Fern Tree. Following the Fern Tree community bushfire Forum the Community Development Officer met with leaders of five community Fireguard groups in Ridgeway to discuss pilot templates for a bushfire survival plan. In addition, a number of residents from Grays Road who were unable to attend the Fern

Tree Forum contacted the Community Development Officer and a meeting was conducted to provide them with some of the information and resources that were made available at the Forum. A property assessment by the local volunteer fire brigade was also arranged for one of these properties as a result of this meeting. The Community Development Officer was also invited to attend a meeting of the Bracken Lane Fireguard group on the 28th of November, 2009. The Bracken Lane Fireguard group is one of the longest running Fireguard groups in southern Tasmania, and the meeting provided an opportunity not only for the group to discover what the Community Development Project entailed and if it could provide them with further support, but it also gave the Community Development Officer a valuable insight into how the Fireguard group operated and what sort of support it provided to its members. This information was invaluable to the subsequent development of a new community bushfire group template that resulted from the Pilot. The Community Development Officer also met with the Fern Tree Community Association executive to determine other effective ways of engaging more residents in the community.

A result of consultations with the Fern Tree community was the consistent request for the establishment and facilitation of more Fireguard groups. As the TFS was enthusiastic to use the Pilot to determine how they could more effectively support the community and thus potentially tailor more effective engagement programs (as previously discussed, section 8.3.3.2, the previous model of Community Fireguard was not effective in sustaining community bushfire preparedness), the Community Development Officer was encouraged to develop a new, more suitable program that would facilitate the formation of community groups

with the aim of increasing the level of community bushfire preparedness, and sustaining this into the future.

This process was facilitated by the appointment of a Community Engagement Officer within the Fern Tree volunteer fire brigade. Formally the 2nd Officer, this volunteer with 30 years of experience voiced his desire to encourage more engagement between the volunteer fire brigade and the community, and as a result, increase community preparedness within the Fern Tree community. This new volunteer fire brigade role, formally recognised by the Tasmania Fire Service, presents a positive step for the agency's shift from information dissemination to a community engagement approach in terms of community bushfire education. Consequently the Community Development Officer and the new Fern Tree Community Engagement Officer developed a community group template named Bushfire Ready Neighbourhoods (to replace Community Fireguard) to trial within the Fern Tree brigade's response area, which includes the communities of Fern Tree, Ridgeway and Neika.

Furthermore, the Community Development Officer and Fern Tree Community Engagement Officer finalised in November 2010, a Household Bushfire Survival Plan to be trialled in the Fern Tree area. This A5 booklet, developed in consultation with the Fern Tree Community Engagement Officer, provides residents with a step-by-step guide to develop their own Bushfire Survival Plan. The Plan stresses the importance of property preparation and the need to make the choice between leaving early or staying and defending. Subsequent to the feedback received from residents who trialled this Plan, the Household Bushfire Survival Plan could potentially provide an invaluable tool allowing Bushfire Ready

Neighbourhood group members, and other members of the community, to more easily and in greater detail, prepare their own household survival plan.

Through the support of the Bushfire Ready Communities Tasmania Pilot and through the commitment of the Fern Tree volunteer fire brigade, and especially the newly appointed Community Engagement Officer, 15 new Bushfire Ready Neighbourhoods have been formed. These groups have all met with the Community Engagement Officer at least once since 2009, have established 'phone trees', have an understanding of which group members have what resources, and a basic understanding of what each of the members' emergency plan is (i.e., who is staying to defend, and who is leaving early). Furthermore, the Fern Tree brigade has continued to conduct individual home property assessments, providing residents with very specific and contextual bushfire preparedness information.

As discussed earlier (see section 3.2) the success of such a community engagement program can not accurately be determined by the number of groups established or residents involved, and rather, longitudinal qualitative data (e.g., interview data) would need to be conducted into the future to determine the program's success. The longitudinal data presented in Chapter Eleven goes some why to present such an evaluation.

Huntingdon Tiers, Bagdad. As a follow-up to the Forum, the Community Development Officer invited Forum attendees to have their properties assessed by the District Officer during a Field Day held in November, 2009 (see Table 38). A total of nine residents attended the assessment of four properties. Feedback from this initial Field Day included the benefit of confirmation from the District Officer that existing bushfire preparation and survival plans were adequate, or specific and

rational advice on how to better prepare. Residents also commented on the benefit of the opportunity to network with other people in the community and the appreciation that there are other people in the area that are also bushfire aware and prepared.

Following the positive feedback from this earlier Field Day, the Community Development Officer sent invitations to residents of the larger Bagdad area in an attempt to attract more participants for a follow-up Field Day the following bushfire season (January, 2010). Seven property owners contacted the Community Development Officer to offer their properties for assessment during the Field Day, however, due to time constraints, only four were selected. In total 28 Bagdad residents participated in the Field Day.

Field Day participants were asked to complete a brief feedback survey at the end of the day (n = 18) (see Appendix J). Residents were asked to comment on what was good and/or beneficial about the day's activities and if they could recommend any improvements. All responses indicated that the activity was very informative, and most suggested that the format of the community assessments was really valuable in that it provided specific and contextual advice on how to prepare for bushfire from various property examples. Other comments included:

> *Example 1* – "Extremely informative. I think it was valuable to be able to physically attend other properties to learn and observe what is available to fire prevent you property. It is also good to meet people in your area to maybe set up a safe area for the situations if need be."

> *Example 2* – "Enjoy the fact that it's hands on, viewing properties and general discussion. Different ideas."

Suggested improvements for the day generally consisted of more hands-on fire training (e.g., how to use fire pump) or a specific fire training day at the local Fire Station. Others suggested that because of the benefits of the format, the Field Day should be an annual event and that more people should attend:

> *Example 3* – "I don't think it needs improving. If you can try and get more people and their properties on board then a larger per cent of the community will learn about the danger to their houses and wether (sic) to stay and fight or evacuate."

As a result of the second, much more widely attended Field Day, the Community Development Officer met with a local resident who wished to set up a Bushfire Ready Neighbourhood in her local area. Currently there are eight property owners interested in belonging to the group. The Community Development Officer has thus acted in a facilitating role offering advice and resource support. One of the first 'tools' the Community Development Officer suggested the group adopt was a telephone tree that not only included all the contact details of the group's residents, but also a brief summary of fire fighting resources (e.g., pumps, hoses etc.) and likely plan (e.g., stay or go early) of each group member so that the group members are as equipped as possible to support each other in the event of a bushfire in their area.

9.2.5.1 Discussion

During the two years that the Bushfire Ready Communities Tasmania Pilot ran (2009-2010), over 300 community members from the four target areas participated in at least one of the Pilot's various community bushfire development activities (e.g., Forum, Field Day etc.) facilitated and/or supported by the Tasmania Fire Service Community Development Officer. As a result, 300 community residents

have received more specific and contextual bushfire preparedness information than they would have otherwise received from traditional forms of TFS education material (e.g., pamphlets, TV ads etc.). Determining how many additional community members have benefited from this program as a result of information being disseminated through word-of-mouth would be impossible.

Importantly, the District Officers of the four communities strongly supported the Pilot and especially activities such as the Field Day as it allowed more community members to participate in and benefit from the traditionally resource taxing, but highly effective (Martin et al., 2007) individual property assessments. Furthermore, increasing community involvement and the opportunity to engage with other likeminded community members at such activities, allowing for increased networking and resource sharing, will promote resident empowerment thus leading to more prepared and resilient communities (Jakes, Burns, et al., 2007; Paton, Johnston, Smith, et al., 2001; Paton & Wright, 2008).

An important finding of the Pilot is that engaging community members to become more bushfire prepared is not a 'one size fits all' model. Rather its success is a function of the strengths and resources existing in a community that can be harnessed and utilised to facilitate preparedness. Given the diversity in, for example, demographics, history and characteristics, the Pilot demonstrated a cost-effective approach (e.g., Field Day template) to tailoring risk communication to specific communities.

As this Pilot has demonstrated, although most communities have the capacity to become a 'bushfire prepared community', how this can be achieved differs depending on the resources (e.g., time, money, willingness to collaborate) and

competencies (e.g., prevailing levels of active participation) available in each community. For example, in many communities there are ‘leaders’ who possess invaluable information about the community, and thus, through collaboration with these individual facilitators can build upon existing relationships, establish new relationships, and utilise these resources to ensure that future risk communication and education is more relevant and thus effective (Eng & Parker, 1994; Lang et al., 2006; Martin et al., 2007). Arguably, much of the success of the Pilot can be attributed to the Community Development Officer first engaging with leaders of the four target communities (e.g., to ensure the process was accepted by people and consequently increasing interest and commitment to the process) and utilising their specific knowledge and resources to ensure that the activities that were organised were appropriate for the residents in each community.

Additionally, engaging with existing community groups provides an efficient and effective way for facilitators to obtain information about a community and their current level of bushfire risk awareness, preparedness, and motivation to mitigate negative hazard consequences (Martin et al., 2007; Murphy, 2007). As a result, the information that is presented at the community bushfire preparedness activities will contain appropriate detail so as to ensure that the community understands it and the benefit of adopting such preparedness behaviours, thus ensuring the greatest potential for the residents actually adopting those measures. Furthermore, having engaged with and being familiar with existing community groups, hazard management authorities can utilise these existing relationships to quickly disseminate hazard information and effectively communicate important information to multiple groups (Murphy, 2007).

By being able to utilise the information they have been given to achieve their goal of becoming more bushfire prepared, the community members will feel empowered by the source of that information (Paton, 2007b, 2008). Hazard research suggests residents who are involved in community activities and who feel empowered by the information that is provided to them, are more likely to feel that they can effectively achieve their goals, and are thus more likely to engage in preparedness activities (e.g.,Paton et al., 2010). The development of the Bushfire Ready Neighbourhoods template, and the establishment of the volunteer fire brigade Community Engagement Officer role to facilitate these groups and guide them through the Household Bushfire Survival Plan, is an example of how this Pilot has used hazard research findings to ensure evidence-based practice.

As well as recognising that communities are unique (e.g., with regard to previous bushfire history, demographic make-up etc.) and thus highlighting the importance of specifically tailoring risk communication and preparedness education for them, there is growing recognition that residents, as a function of, for example their knowledge of bushfire risk, their motivation to prepare, and at what decision making stage they are at, may be motivated to engage in risk-reduction behaviours by significantly different types of information (Martin et al., 2007). For example, the Pilot identified the importance of adapting content to meet the needs of those just starting to engage in preparedness process (e.g., basic information and question time offered during Forums) and that this content was very different from that required by those at more advanced levels of preparedness (e.g., context specific information provided during Field Days).

Furthermore, as community members become more prepared for bushfire as a result of for example, successful engagement programs, the information they

require to continue improving their level of preparedness will become more detailed and complex. As a result, facilitators will need to ensure that community engagement programs evolve and adapt to the community members' needs as people become more 'expert' over time and against a backdrop of changing community membership and interests (Paton & Jang, 2011).

Interviews with residents who participated in only one Pilot activity indicated that the main reason (excluding not being aware of the activity, or being unable to attend due to prior commitment) for not attending follow-up activities was because they felt they had already learnt the content at the previous activity and thus did not see any benefit in attending the subsequent activity.

> ... *(Did you go to that one at all Sam?* [Referring to second Field Day that was held in Bagdad] No, I didn't *(No? You went to...)* No, I was assuming it would be exactly the same as what was held here last year *(Ok, and and just to make it really explicit, so the reason that you didn't go to that one is cause you'd already gained that information from the last time?)* Yep, that's right, yep..." (Sam from Bagdad, 16/12/10)

This challenge of continuing to engage community members who perceive themselves to be 'adequately' prepared and thus do not feel it necessary to attend future community engagement activities (as discussed in section 8.3.1.4), needs to be incorporated into future research to ensure that these individuals are in fact engaging in current best-practice bushfire preparedness. Future research should also seek to better understand what motivates community leaders to become 'leaders' and to continuously and tirelessly work to promote bushfire preparedness in their communities. Furthermore, how these leaders can be supported and motivated to continue their great work once other members of their community reach this perceived level of 'adequate preparedness' and no longer attend/support organised

activities, and avoid these leaders experiencing ‘leadership fatigue’ (see section 8.3.3.2), is also an important future research direction.

As determined through consultation with the volunteer fire brigades in the Pilot, although all volunteer fire brigades appreciated the benefit of a community bushfire preparedness facilitator, not all volunteer fire brigades have the resources to provide such a service. Furthermore, fire brigade members deemed it important that facilitation of such community engagement should be conducted by someone who is trained or has specialised knowledge of bushfire preparedness so to ensure that communities receive the most accurate and up-to-date information. An obvious recommendation to emerge from this Pilot is that the TFS provide facilitators whose role it is to help volunteer fire brigades and their communities engage to ensure that bushfire preparedness in their area is a ‘shared responsibility’, thus promoting increased and ongoing community-driven bushfire preparedness.

It is important at this point to acknowledge the fact that during the Pilot, the Community Development Officer engaged with four communities, mainly in the southern part of Tasmania, as this was all resources allowed for. As word of the Pilot spread, the Community Development Officer was contacted by other communities on numerous occasions (e.g., Woodbridge, Kettering, Middleton, Margate, Dolphin Sands, and Scamander) to provide them with support and facilitate a similar program in their area, thus providing evidence for communities’ support and appeal for such facilitation. Unfortunately, due to the resource limitations of the Pilot (i.e., there only being one Community Development Officer) these requests were declined. One exception, however, was made.

The necessity for community engagement programs to be flexible and address the issues and needs of individual communities was an ethos adopted by the Pilot, and although restricted by resource limitations, did extend its program to target a key issue identified by the questionnaire (Chapters 5 and 7) and interview data (Chapter 8). The finding that women were less prepared than men for bushfires, and more likely to leave early without preparing to do so, was an issue that the Pilot felt was necessary to address. The fact that women were also found to be less likely to engage in traditional forms of fire agency community bushfire education (e.g., information sessions) further highlighted the importance of the community education Pilot to develop and trial a more appropriate and effective preparedness program specifically targeting women. The following chapter presents the results of this pilot program.

The two-year Bushfire Ready Communities Tasmania Pilot concluded in February, 2011. The benefits accruing from the Pilot, which range from more cost-effective use of agency resources to increasing the likelihood of sustained bushfire preparedness, provide a cogent argument for continuing and expanding bushfire risk communication programs based on community engagement and empowerment principles.

Chapter Ten - Targeting Women's Bushfire Preparedness: Extension of the Bushfire Ready Communities Tasmania Pilot

10.1 Rationale

A significant finding of the questionnaire (Chapters 5 and 7) and telephone interview (Chapter 8) data was a tendency for women to 'plan' to leave early in the event of a bushfire but to not actually in engage in any preparation for such a plan. Telephone interviews with these women, especially those with young children, revealed that they had not even contemplated a contingency plan in the event that they could not leave, thus not concerning themselves with learning how to use the fire pump, generator, or sprinkler system their family/partner might have had in place. It thus became evident that the fire agency's awareness campaign/bushfire preparedness initiatives, which specify the need to prepare for leaving early as well the possibility of not leaving early, was not effectively reaching these women.

Made possible by the action research nature of the study, the TFS Bushfire Ready Communities Tasmania Pilot was extended to develop a bushfire preparedness program specifically targeting women. Ethical approval was sought and obtained from the University of Tasmania Human Research Ethics Committee, to conduct a focus group with a group of women from the Middleton community (approval number H10859). The community of Middleton was selected as this was one of the communities that had contacted the TFS Community Development Officer to be a part of the Pilot but were initially refused due to lack of resources. Middleton was also selected because several women from the community were telephone interview participants and the researcher knew that they were interested in increasing their community's bushfire preparedness (thus highlighting the benefits of researcher/agency collaboration in action research).

10.2 Approach

Traditionally, due to the relative gendered division of labour (within society, with women's domestic duties being centred more within the home and men's domestic duties more outside the home (Fothergill, 1998), men more often perform what is commonly seen as the 'customary' bushfire preparedness activities such as clearing of bush, slashing grass, burning off, cleaning gutters, and maintaining and 'manning' fire pumps. This was reflected in the telephone interviews conducted with women in the four target communities (Chapter 8). Therefore, women are commonly less competent in these tasks because they have had less experience, and thus rely on the men in the household carrying out these mitigation behaviours. Furthermore, these activities are also traditionally associated with the 'stay and defend' bushfire plan; a decision not traditionally adopted by women, especially those with young families as was confirmed by previously discussed mixed-methods data (i.e., questionnaire data revealed that women were more likely to 'leave early' and telephone interview data showed that the majority of the women who intended to leave early attributed this to wanting to protect their young family). However, when asked what actions they had engaged in to ensure that they were prepared to 'leave early' it was evident that limited 'preparing' or planning had been engaged in (e.g., did not have a list of what to pack, where to go, contact numbers etc.). It could therefore be argued that women do not typically believe that 'leaving early' requires considerable preparation.

Furthermore, a majority of participants who indicated that their plan was to leave early had not engaged in any activities to mitigate the bushfire risk to their property. This is of particular concern considering that fire service authorities instruct that residents who intend to 'leave early' also need to prepare to 'stay and

defend' in the event that those residents cannot leave early or early warning is not received. This advice is based upon the fact that leaving at the last minute during a bushfire is one of the most dangerous things a resident can do (Tasmania Fire Service, 2011).

Therefore, it seems that the current format of bushfire education is not effective in informing women of bushfire preparedness best-practice, providing a cogent argument for tailoring more specific bushfire preparedness activities targeting women (as was recognised by the South Australian Country Fire Service who developed the basic bushfire safety skills for women workshops, upon which this subsequent program is based).

10.2.1 Developing the Women's Bushfire Preparedness Workshop

Based on these data and similar ventures adopted by other fire agencies within Australia (e.g., South Australian Fire Service), the TFS Community Development Officer decided to pilot a women's bushfire preparedness workshop. The template of the workshop included the support of an agency representative (e.g., in this case the TFS Community Development Officer, but could also be fulfilled by similar role of a local council) but was intended to be organised and facilitated by a female community member. The development and evaluation of the workshop pilot was conducted by the researcher as part of the action research. The workshop was evaluated and deemed successful if participants had acquired new bushfire skills/knowledge, and whether any social benefits were obtained from participating (evaluated by means of pre and post workshops surveys; see Appendices L and M).

As previously mentioned (see section 7.2.4), women are more likely to engage in local grass roots organisations as opposed to larger formal meetings

(Enarson, 1998). Therefore, a workshop format was adopted, incorporating group discussions, practical demonstrations, and group work activities. As part of the action research process, how these workshops were run, what they included, when and where, and who would provide the training was to be decided by the female participants themselves.

The workshop template designed by the TFS Community Development Officer and researcher, was intended for the participation of up to 20 women, included both theory and practice sessions, and the bushfire information and training to be provided by a (preferably local) trained individual such as a volunteer fire fighter (to promote the trust the women felt for this 'expert' and their advice). Apart from these 'criteria', the format was to be adapted and tailored by the female participants themselves to ensure maximum effect (i.e., promote ownership, control, and thus sense of empowerment). Therefore, the community facilitator (who also happened to be a telephone interview participant) telephoned and invited women from around the community to attend a 'morning tea', where amongst other things, the pilot workshop and template would be proposed to them.

In addition to examining the relationship between personal competencies, group processes, and skill development, the action research would examine how the workshop experience contributed to fostering community involvement and participation and promote psychological benefits such as empowerment (e.g., through engaging residents in local decision making processes), sense of community (e.g., achieving local change), and social support (Christens & Speer, 2011).

The rationale for this approach derives from the study's earlier findings (Chapter 6, Figure 6; Social Attachment Model of Bushfire Preparedness) that the

level of people's community involvement (e.g., belonging to local progress groups etc.) directly predicted residents' level of preparedness (e.g., had a fire plan, owned fire pumps and generators etc.).

Increasing involvement in the communities with whom residents' identify (in this case, this was strongly linked to the sense of shared fate that accompanies living in high fire risk communities as many of these women did not previously know each other), and the opportunity to engage in discussion of bushfire issues with other likeminded community members at such activities, facilitates the kind of networking and resource sharing required to promote the development of sustained beliefs in the importance of preparing (Jakes, Burns, et al., 2007; Paton, Johnston, Smith, et al., 2001; Paton & Wright, 2008).

Therefore, by utilising a format that promotes increased community involvement, coupled with providing an environment that promotes greater skill development (empowering setting), the proposed Women's Bushfire Workshop sought to provide a tool for local grass roots groups (e.g., Bushfire Ready Neighbourhood groups) to engage women to become better prepared for bushfires and promote an ongoing culture of bushfire preparedness within the community.

10.2.2 Morning tea

On the 12th of March, 2011, 17 women (and 3 children), the TFS Community Development Officer and researcher, attended a morning tea hosted by one of the women of the community to participate in an informal 'talk fest' to discuss with other ladies how to better prepare for bushfire, how to get other residents more involved, and increase sense of community. The hosting lady had also told her invitees that the researcher and TFS Community Development Officer would be

there to talk about the workshop template they had drafted, to find out if the women were interested in participating, and if so, what they would like to cover and how they would like to run it.

Many of the participating women had never met each other and therefore, although they had consented for the 'focus group' to be audio recorded and were aware that one of the main aims of the meeting was to talk about bushfire preparedness and the workshop template, discussion promptly turned to what they could do increase community involvement and foster a greater sense of community within Middleton. The women, especially those with young children, were soon planning potential toy swaps, informal crèches, and weekly 'coffee shop' events at the local hall. This suggests that the women's desire to foster a greater sense of community and increase community involvement was more of a priority than increasing their bushfire preparedness. This supports past research that people's other everyday priorities often outweigh bushfire issues (Bushnell et al., 2007; Lindell & Whitney, 2000; McIvor & Paton, 2007; Motoyoshi, Takao, & Ikeda, 2004; Paton et al., 2005). However, importantly, desire to increase sense of community and resident involvement is not at odds with or independent to the process of increasing community bushfire preparedness (Paton, Frandsen, & Tedim, 2012) as was demonstrated by the Model (Chapter 6, Figure 6).

Interestingly, when the younger women asked the older residents why such events were not already in place or had not been organised, they received a wry smile and the answer that all these events, or similar, had in fact run in the past but had discontinued do to the lack of continued motivation and involvement from the community (and thus relates to 'leadership fatigue' discussed in section 8.3.3.2). This suggests that past and future community bushfire preparedness initiatives will

have similar fates unless these initiatives can be developed in a way to engage the community to sustain these practices.

These non-fire specific conversations continued for the good part of an hour before the host reminded the women that one of the main reasons they were there was to discuss bushfire preparedness issues and whether they were interested in participating in a Women's Bushfire Preparedness Workshop. When the researcher asked about the women's present level of preparedness most indicated that they intended to leave early. When they were asked whether they had organised a 'leave early' kit, only about a third indicated that they had. This elicited an interesting remark from one of the participants:

> ...I'd love to see um that the children get involved as well and I mean you say 'who's got a box that has all their important things', my son has his most precious things that are beautiful and you'd love to see out on his shelf, in a draw, his top draw, and he says to me the other day, 'mummy, if there's a tsunami, I want you to take my first top draw', it's like 'righto, it's all there'! (all laugh, 'oooh') you know, we've got ninja cards, we've got...Bear Grylls books...but I just think yeah, that's awesome that he has that in his mind and I just think well, if the kids know that, and you know what, it was him saying that that made me put all my in my box, and I went 'yeah, see, he's more prepared than me now'... (Suzie from Middleton)

This highlights that women's motivation to prepare is very much influenced by their children's safety but also the conversations they have with their children about bushfire preparedness. This was explored earlier in section 8.3.2.3. For example, Suzie was motivated to prepare more after she realised that her son had already started thinking about what he would like to take with him in the event of a disaster like a tsunami. Before this conversation with her son, Suzie might have felt that preparing for natural disasters was not high on her list of priorities, but, after

realising that this was an issue that her son had considered, she too made it a priority to think about preparing for disasters.

This extract, and earlier extracts (see section 8.3.2.3 – ‘family dynamics’) highlight the intricate relationship between the women’s own beliefs regarding bushfire preparedness, their belief in their children’s appropriate exposure to such risk information, and their subsequent bushfire plans (or lack thereof). This further highlights the importance of any program specifically targeting the bushfire education of women to be specifically tailored to the needs of individual groups of women. This could be as simple as ensuring any such education session is organised on a day when suitable childcare can be organised, or adopting the education session in a way that can include the participation of children.

At the conclusion of the morning tea, the women decided that they would like to participate in a Women’s Bushfire Workshop and completed a form indicating what kind of content they would like covered in the workshop. Figure 8 shows the options form given to participants and sum of selections (in bold) provided by participants.

Options for inclusion in a Women's Bushfire Workshop Program		
Time	***Proposed Activities (Please ☑ modules you are interested to learn more about)***	
	Bushfire Theory Sessions:	
30mins	Bushfire Behaviour	**7**
15mins	How houses burn	**6**
20mins	How to prepare your home	**5**
20mins	Psychological preparedness	**6**
10mins	Personal Survival	**8**
20mins	Experiencing a fire (DVD footage & discussion)	**5**
5mins	Fire danger ratings, what do they mean?	**4**
15mins	Where to find information about potential bushfires	**6**
15mins	Establishing a Bushfire Ready Neighbourhood Group	**6**
1hr	Preparing a personal and household survival plan	**5**
30mins	Home fire safety – (smoke alarms, evacuation plan etc)	**3**
	Other suggestion(s): **chainsaw workshop**	**2**
	Practical Session:	
2 hr	Property assessment – (using a scoring system to assess bushfire risk)	**4**
15mins	Types of fire fighting equipment	**5**
1hr	How to operate a fire fighting pump	**7**
15mins	Feedback & Post workshop questionnaire	
Are you interested in participating in a bushfire preparedness workshop for women? **Yes n = 10** Most suitable time – **Saturday PM**		

Figure 8. Content options for inclusion in Women's Bushfire Preparedness Workshop template.

The Workshop was then agreed to be held on the 14th of May, 2011 (i.e., most women indicated they could attend on this day), and one of the participants volunteered to host it on her property. The ladies also agreed that a certain local volunteer fire fighter, whom they all agreed was very knowledgeable and approachable, would be invited to provide the bushfire theory and practical demonstrations at the Workshop. It was also agreed that this volunteer, the morning tea host and future workshop host, along with the TFS Community Development Officer and researcher, would collaborate to finalise the Workshop proceedings. The Women's Bushfire Workshop program is provided in Figure 9.

FIRE FIGHTING WORKSHOP FOR WOMEN WHO AREN'T FIRE FIGHTERS AGENDA		
1.00pm	Introduction	The importance of establishing bushfire-ready neighbourhood groups
1.10pm	Psychological Preparedness	Personal survival and preparing household survival plan
1.40	Bushfire behaviour	How fires burn, where to find information (PowerPoint presentation)
2.00pm	Break for tea and coffee	
2.20pm	Move outdoors for hands-on, practical demonstrations in how to prepare your home against bushfire and the use of fire fighting equipment and tools, experiencing and extinguishing fire	
3.30pm	Feedback session	Tea and coffee
4.00pm	Workshop concludes	

Figure 9. Middleton Women's Bushfire Workshop program

Interestingly, at the conclusion of the workshop several of the younger women who had so enthusiastically discussed organising and forming community groups such as 'toy-swaps', crèches, and coffee shops, remained at the end to continue to plan, exchange phone numbers and email address, and chat over more coffee and cake.

10.2.3 Women's Bushfire Workshop - Findings

Three women from the local area (two from Gordon, one from Middleton) participated in the Women's Bushfire Workshop. The women were asked to initially fill out a pre-workshop survey to gauge their demographic profile, reason for participating, and expectations. The women were all full time residents and time lived in the community ranged from four and a half years to 35 years. Two of the women had been involved in building their homes, and all three women were retired. The three participants were all over the age of 61 years, had no children living with them, and one lady indicated living alone.

As detailed in the post-workshop survey (Figure 10), the workshop was well received and all three ladies indicating intending to become more prepared as a result of attending the Workshop. Of particular benefit was ability for the other two participants to compare their own individual preparedness with the hosting participant's property. Cathy explained (Figure 10 - post-workshop survey, question 12), that she would even consider to 'stay and defend' if she was as prepared as Maggie was. The importance of having specific referents as offered by this workshop (as well as the Field Day template) is that residents have a more realistic and accurate understanding of what is required to be adequately prepared for bushfire, thus avoiding cognitive biases such as unrealistic optimism bias (see section 8.3.1.4).

Women's Bushfire Workshop Pre-Workshop Survey

	Question	*Cathy*	*Maggie*	*Lucy*
	Questions 1 to 8 elicited demographic information			
9	Bushfire risk in community?	Yes	Yes	Yes
10	Which time frame do you think bushfire is likely to affect you in the future?	In next 3 to 12 months	In the next 3 to 12 months	In next 1 to 5 years
11	Previous bushfire education activities?	Yes	Forum, Info night, Field Day	No
12	How did you hear about Workshop?	Neighbour	Through fireguard spokesperson	at [Women's meeting]
13	Why did you attend Workshop?	To be more prepared to know what is the best way to go	Kick in the bum, hands on, update in fire behaviour	
14	How well aware are you of bushfire risk? 1/not at all-5/very much	5	5	5
15	How well prepared do you think you are for bushfire? 1/not at all-5/very much	3	4	4
16	Stay and defend or leave early?	Unable to answer. If in different conditions I would prefer to stay and defend	Say and defend if code catastrophic; would prepare, set sprinklers and go to water or Gordon oval	stay and defend
17	Explain reasoning for above plan:	Pine trees	Only way out - would rather die on oval than in a car with everybody hysterical, trapped, blocked	I like my place
18	Please provide details of preparation:		fire pump, sprinklers, clearing, bio-mass reduction, have a PLAN, tools for working with situation and protecting self	sprinkler system, clear paddocks
19	Who undertakes preparing at your home?	Prepare together	On my own, support from local fire brigade person - very knowledgeable	

Women's Bushfire Workshop Post-Workshop Survey

	Question	*Cathy*	*Maggie*	*Lucy*
1	What is your overall impression of today's Workshop?	Was very helpful, gave me more knowledge for prep.	Poor attendance because of weather? Or DENIAL??	Informative and enjoyable - psych section interesting
2	What was the most beneficial aspect of attending today's Workshop?	How *Maggie has her property, set up against bushfires	Just bringing 'it all' out of the closet once again!	Seeing our host's preparedness pack
3	What, if anything, did you learn today in relation to bushfire preparedness?	Sprinklers and set up pump closer to house, also masks and all Peter showed us	Specific demonstration of fire behaviour in our and thanks to Pete	I need to make a plan
4	What would you have like to learn more about?	Satisfied with what I was shown today	Always open to more/new information	
5	What improvements could be made to the Workshop?	To let more people know and try to get more along	Very good format and presentation	
6	Were your expectations of the Workshop met?	Yes	Needed more people to ask more questions	Yes
	Question 7, 8, and 9 utilised a 5-point Likert scales where 1 = not at all, 5 = very much			
7	How well aware do you believe you are of the bushfire risk to your community?	5	5	5
8	Since participating in the Workshop, how well prepared do you think you are currently?	3	4	between 3 and 4
9	Since participating in the Workshop, do you believe you understand how to prepare for bushfire?	5	5	5
10	Since participating in the Workshop, do you intend to increase your level of preparedness for bushfire? Why?	Yes - Need to think more about preparation and to do it	Yes - Always some little thing that could be improved	Yes - More sprinklers, clear garden more
12	Has your decision to 'stay and defend' or 'leave early' changed as a result of attending this Workshop?	Yes - If I am prepared the way Maggie is I would stay and defend	No	No

Figure 10. Pre and post Women's Bushfire Preparedness Workshop surveys completed to gauge participant outcomes.

10.2.4 Discussion

Unfortunately, due to the Workshop 'clashing' with a Thai cooking demonstration, only three women out of the 17 who attended the morning tea, and agreed on having a Women's Bushfire Workshop, attended the Workshop on the 14th of May, 2011. This however, may reflect that depending on the time of year and weather conditions (discussed further in Chapter 11), the perceived risk from bushfire may be low and thus participation in bushfire related activities/education not a priority. Given the choice, these women were more interested in participating in a cooking demonstration than a bushfire education workshop. This provides an example of how competing interests can affect engagement. However, this low attendance (at the bushfire workshop) may also reflect that building a greater sense of community through community involvement (i.e., locally organised cooking demonstration), is more of a priority to these women than increasing their bushfire preparedness. This further implies that community bushfire preparedness cannot be achieved without a prior established 'sense of community'. This notion is reflected by the Model (Chapter 6, Figure 6) which depicts psychological sense of community and community involvement as mediating the relationship between individual level processes and actually adopting preparedness measures.

The three female participants, all retired and aged over 60 years do not provide a very representative sample of the population but does tentatively suggest that the Workshop format attracts this particular demographic. How to engage younger women, especially those with young children continues to provide a specific challenge. Perhaps future community engagement initiatives need to develop programs specifically targeted towards children. In this way, as discussed in section 8.3.2.3, by developing programs that engage with children, agencies may have a

better chance of engaging their mothers (and fathers) too. Although poorly attended, the benefit of this workshop is that three women are now more aware of how to prepare for bushfire. It is hoped that this knowledge, and positive experience of participating in the Workshop, will be passed on to their other female residents.

10.2.5 Further developments

Interestingly, although the Women's Bushfire Workshop was so poorly attended in May 2011, the morning tea held in March 2011 resulted in the beginning of close friendships being formed between several of the women, which have since resulted in the planning and hosting of very successful community events. A Winter Solstice Festival held in July 2011 saw the attendance of over 200 people from the Middleton and surrounding communities. Retired residents, young families, and friends of friends' alike enjoyed food prepared by volunteers, live jazz performances, a lantern parade, bonfire, and face painting for the kids. Carmen from Middleton, one of the organisers, explained how she and her three friends had had such an enjoyable time organising it, and the positive response from the attending residents had been so overwhelming, that they intended to host another Festival in 2012 (personal correspondence with Carmen, telephone call, 26th January, 2012). Two months later, the group hosted a Community Dinner with a French theme held in the Middleton Hall. This again was very well attended (more than 50 people) and saw four pairs of new Middleton residents attend (Carmen, personal correspondence). As such, although the women who engaged in the morning tea in March 2011 were not very motivated to participate in bushfire preparedness activities, the resultant social networks that formed has fostered a greater sense of community in Middleton; a fundamental precursor (as demonstrated by the Model, Chapter 6, Figure 6) to communities becoming bushfire prepared.

Chapter Eleven - Longitudinal Study Component: Follow-up Telephone Interviews with Residents from the Four Target Areas

11.1 Individual and Community Preparedness Change as Result of Pilot

By using the empirically validated Social Attachment Model of Bushfire Preparedness to develop and inform the design and implementation (based on the principles of community engagement) of the Pilot, it was anticipated that bushfire preparedness would not only increase within the communities, but because it would be developed from the ground up (i.e., driven by the community themselves), this proactive behaviour would be more likely to be sustained over time. Longitudinal data collected from interviews conducted with the original 34 community members (initial telephone interviews conducted during the 2009/10 bushfire season) one year later, in the lead up to the 2010/11 bushfire season, provided support for the efficacy of the Model's (Figure 6) application.

For example, the Model suggests that people's belief in their responsibility to prepare directly affects their intentions to prepare. One of the advantages of the Forums and Field Days was the ability for the local volunteer fire brigade to explain and show the residents their limited resources. In most cases, the local volunteer fire brigade were equipped with only one truck, and the comment made by one brigade member "there's one truck and over 500 homes; you do the maths" was a confronting realisation for some residents. Jeremy explains that he would not rely on the volunteer fire brigade to help him during a bushfire because;

> ...there's too many places to get around, if there was a decent bushfire, they've got one vehicle in Binalong and I'm not sure, one or two in St Helens [closest neighbouring town], yeah, nah there wouldn't be time.

Clint from Bagdad explains;

> I think the biggest problem is, and people will need to get this in their heads as quickly as possible, fire brigades can't be everywhere at once and that's the way we've looked at all our situations and said 'well, ok, they can't really be there' so it's up to us...

A further advantage of the Forum and Field Day templates was their providing settings for residents to come together, interact, form networks, and collectively problem solve bushfire issues. This reflects the Model (Figure 6) pathway which illustrated a direct predictive path between community involvement and bushfire preparedness. Furthermore, the Model suggests that by holding these events in residents' immediate localities (rather than holding information sessions in a municipality centre) the place attachment people feel towards their community and resultant bond they have with the people in it (psychological sense of community) will increase the likelihood that more people involve themselves in future offered programs (e.g., Forums, Field Days). This community involvement may be further encouraged by the positive peer pressure (see section 8.3.2) felt from fellow prepared community members.

The Field Day format, conceived to provide community members with an opportunity to interact and collectively benefit from the traditional individual property assessments, also hinged on the provision of specific and contextual information provided by an authority on bushfire safety. Practical solutions and advice, provided by a fire fighter whose opinion was trusted by the community, allowed the participating community members to confidently increase their bushfire preparedness. Subsequent telephone interviews with participants of Field Days indicated that they had since adopted the recommended mitigation actions including

buying a fire pump (James), covering under the house with metal mesh (Tony), and removing overgrown vegetation;

> Yes, we went around all the houses and [District Officer]...and he's er came around and found all these things that weren't quite right and clean up underneath the house, done all that, yes we've done a lot of his recommendations (Graham from Binalong Bay)

The Bushfire Ready Neighbourhood community group template was also based on the Model's findings and hazard literature, which explains that by increasing community involvement, shared community narratives and tangible resources, it would increase residents' feeling of empowerment and thus promotes their adoption of risk mitigating behaviour.

Erika from Fern Tree explained that she feels more prepared now (second interview) compared to at the time of the last interview due to being involved in a Bushfire Ready Neighbourhood group and the comfort and support it provides.

> ...and certainly the fire tree like I know that we've got that now, you know I think we've got more of an awareness as a group, as a street of who's prepared to stay and who's going...also us having that sense of community because there's sort of a sense, I don't know, it's just you're not fighting it alone, you know, you've got an appreciation of what people are going to do rather than on the day having to worry about 'well, are the neighbours alright?' you know, 'is their dog alright?' because if you've actually got those processes there I think it's, it just takes one less stress out of it, the unknown sort of stuff...

However, and as indicated by the Model (Figure 6), the continued support and participation of such a community group, relies heavily on residents' sense of community and attachment to the place they live. Carmen from Middleton explains that the lack of sense of community in Middleton has resulted in the establishment of

Fireguard groups (informal local brigade and community initiative based on old Community Fireguard template) following the 2009 Victorian Bushfires losing momentum and just deteriorating;

> ...we've got two I think even possible three new areas that aren't covered [by a Fireguard group], I'm fairly pissed off with the whole thing, people aren't really all that interested, people don't respond, you know we had that thing at the fire brigade [Fire Expo] and hardly any fireguard people came, other people don't take it seriously at all, by and large and don't put themselves out to support...and I personally, I feel like just giving fireguard a great big miss...there isn't a really good sense of community, it's one of the things that's wrong with the place...we've got a post office, but that's it, we don't have a local watering hole...to bring the community together...

Sustained involvement in community bushfire groups, and thus higher rates of bushfire preparedness adoption, is best demonstrated by members who have a strong attachment to place and strong sense of community. The Bracken Lane Fireguard group in Fern Tree was established approximately 12 years ago, but has a history of community bushfire preparedness prior to this arguably due to their eventful fire history (e.g., 1967, 1982, and 1998 bushfires). Residents of the Lane have a telephone tree, list of each other's' resources, pets, spare keys, and Fire Plans. As Sandy and Gus explain, being fire aware and prepared is ingrained in the Lane's culture.

> ...we had new neighbours move in at the top of the Lane and so we all went, they invited us, and we all went there for a house warming for them and they were made aware of the bushfire situation and joining up and they've been sort of brought into that group... *[Do you think it would be very difficult to live in Bracken Lane and not be a part of Fireguard?]* Umm, well, no no I guess we'd leave them alone if that was their choice, yeah, but you'd be silly you know, to live in the Lane and not be aware of something like that, yeah *[it's part and parcel really of living in Bracken Lane isn't it?]* yes, yes *[the risk and also being a part of Fireguard?]* oh absolutely, yes, yep...

Whether this strong sense of community results from shared community narratives (e.g., bushfire history), a collective enthusiasm for community bushfire preparedness developed over the years, a strong attachment to the environment in which they live, or sustained through community involvement, or a combination of all of the above is difficult to distinguish. The complex interrelationships between these variables are reflected by the Social Attachment Model of Bushfire Preparedness presented in Chapter Six.

Interestingly, and although not a relationship directly depicted by the Model (Figure 6), being involved in a community group like Bushfire Ready Neighbourhoods, can also result in individuals' sense of responsibility widening to include that of others. This suggests that a sense of social responsibility may play a role in influencing residents' decisions to prepare (this concept was alluded to in section 8.3.1.2, and will be further discussed in Chapter 13). As Carmen from Middleton explains, since being involved in a Bushfire Ready Neighbourhood group, she also feels responsible for the safety of her fellow community members;

> ...I think I have to set an example for starters and also because this place has been designated as a safe haven if I feel I have an obligation to you know, be able to save the house you know if the worst happens and also provide a safe place for people...

One of the fundamental concepts of the Pilot and the community engagement approach, and as demonstrated by the Model, was that behaviour change (adoption of hazard mitigating actions) had to emanate from the community itself, from the ground up, and not as a result of top-down processes. As a result, products of the Pilot, such as the Field Day and Bushfire Ready Neighbourhood group template, were developed in a way that communities could tailor them to suit their own needs.

The other important outcome of the Pilot was the development of a Community Engagement Officer role within the volunteer fire brigade who could provide support and resources to communities who wished to increase their level of bushfire preparedness but needed a little assistance in doing so. This presents a fundamentally important positive step in changing the fire services' culture of top-down information dissemination community education, to one that embraces a community engagement approach. However culture change will inevitably pose an enormous challenge.

The success of the Pilot and its potential mainstream adoption by the Tasmania Fire Service pivoted on the support, acceptance, and implementation of the volunteer fire brigades. Due to the fire agencies' traditional culture and top-down approach to public education, arguably a reflection of their paramilitary organisational structure, acceptance or even ability to act in such a capacity may be challenging. Cam from Fern Tree, who was a participant of the Pilot and initiated a Bushfire Ready Neighbourhood group in his area, explains how he found the support provided by the volunteer fire brigade somewhat restrictive;

> ...I mean most of us, like the people who are active kind of know where they're at and know what they have to do, the last meeting was actually a little bit tedious because Barry [brigade member] walked through the kind of documentation really painfully, like just a lot too laboriously for everybody, and so I'm actually thinking about how to either take charge of the process or just you know, just make that something where it's not like come and teach the class room sort of thing, cause I mean he's very well-meaning but he sort of wasn't able, I don't know, he just, it was like 'we don't need to sit here for another 20 minutes and just talk through every do point here...

> ...I'm not saying that you know that we know everything but it was more just like we needed really targeted things about our actual concerns and then just, I don't know, we need to encourage each other as a neighbourhood to make those plans you know, I can't see that happening, that that's something we're going to have to work on ourselves you know, sort of keep on top of each other about it... (Cam from Fern Tree)

This suggests that although the Pilot's objective was a 'grass roots' approach, due to the established authoritative culture of the volunteer fire brigade towards public education, best intentions to 'help' and provide support were not appropriate. This suggests that in order for a new approach of bushfire education, based on community engagement principles (see section 3.3.1), to actually work, the culture of fire services, which are more comfortable with the traditional information dissemination and authoritarian approach to community education, needs to change.

Irrespective of the challenges the community/agency relationship poses, Cam expressed that he was still very keen to continue with his Bushfire Ready Neighbourhood group armed with the resources, the 'template'; he now has, and intends to continue to recruit members of his community;

> ...I'm going to do like I did last year, like a sort of 'are you keen? We've got this thing going', we'll just have a sort of a catch up morning tea and then you know, here's the kind of plan for a phone tree and you know, here's the resources we have for building your own plan and, just talk about each other's properties I guess...

As the Pilot intended, and based on the Model (Figure 6) values of bushfire preparedness resulting from engaging and empowering the community members themselves, there is a sense that once residents are provided with the resources, the

Bushfire Ready Neighbourhood group develops through its own natural progression to suit the community itself.

> ...I think what would be best for us to do would be to have a, I think it would be good to have a neighbourhood walk through, you know, I really think it would be good to just have a half an hour or an hour where we all meet and we'd look at the road you know, and just talk about general things about, not each other's properties but just the general things about what if the truck had to get in there, what if it came from that direction or, are there things that we could do as a collective or encouraging the council to help us, and then I think that would be a good seed for you know, people to get the individual [property] visit... (Cam from Fern Tree)

Consistent with the Model analysis, individual and community factors that influence whether people prepare for bushfires or not, operate and interact with each other in a complex way. This highlights the fact that it is imperative that emergency and risk management agencies, including fire agencies, support and develop community engagement initiatives that are as flexible and malleable as the communities themselves, so to allow them to settle into a system that complements their unique qualities.

> *[What do you think the benefit is of having Fireguar*d?] umm, I think it helps people a) be more aware of the necessity to be prepared for fire and it's a place where people can learn stuff, but I think it also has a big community impact as well, I think it gets people talking to other people in their community and again, they don't become best friends and you know...but it makes people aware of the other people in their immediate community and starts them thinking about, well hopefully not just thinking about themselves but also aware of the other people in their community and lending a hand... (Carmen from Middleton)

The follow-up interviews, conducted with residents from the four target communities a year after their initial interview, thus allowed, albeit in a limited capacity, to begin to evaluate the benefits of participating in the Pilot's activities. As discussed in section 9.2.5, the success and benefits (or not) of community engagement initiatives cannot accurately be determined from simple measures of number of groups formed or number of members recruited. Rather, since the key goal of community bushfire engagement programs is to facilitate sustained high levels of bushfire preparedness, qualitative longitudinal data is required.

The data obtained from follow-up interviews with residents presented in this chapter provide only a small snap-shot (i.e., only one year) of the benefits accruing from participation in the Pilot activities. Therefore, in order to truly determine the efficacy of these community engagement Pilot programs, continued longitudinal data collection is necessary. This therefore presents an important future research consideration.

The longitudinal data obtained from these second participant interviews also provide the unique opportunity to follow-up on preparedness measures intended to be conducted by residents. The following section thus provides residents' accounts of whether they did in fact adopt intended measures, and if not, why not.

11.2 Barriers to Preparing Affecting Even the Prepared

The second set of telephone interviews provided a valuable opportunity to determine if bushfire and community engagement intentions projected by residents in their first interview had in fact been adopted one year on. An important finding was that even residents who indicated being really prepared in the first interview (e.g., written fire plan, fire pump, sprinkler system, window coverings) were

vulnerable to commonly cited barriers like ‘other priorities’ or weather and climate conditions not being conducive to bushfire risk.

Table 39 provides extracts from some of these participants in their second interview and highlight the challenge of overcoming seemingly minor barriers (e.g., not for lack of money or physical ability, but rather reflects an attitude) for residents who are very aware of the bushfire risk, know how to prepare, have taken considerable measures to prepare, and understand the importance of being constantly prepared. This finding may also reflect ‘preparedness fatigue’ (discussed in section 8.3.1.5) felt by residents who constantly prepare but who perceive no positive reinforcement for their efforts.

As discussed in Chapter Eight, modifying the way bushfire mitigation strategies are developed and delivered in ways that highlight additional benefits or ‘dual benefits’ of adopting such measures (e.g., sprinkler systems can double as garden watering systems as well as bushfire preparation, emergency survival kits are invaluable regardless of the emergency), may be one way of motivating and sustaining residents’ ‘bushfire’ preparedness behaviour. For example, Carmen from Middleton had installed a sprinkler system that also acted as a garden watering system. This way, the sprinkler system’s installation and operational upkeep would be more likely as its short term benefits would provide more immediate rewards. Similarly, highlighting the benefits of having an ‘emergency kit’ or ‘leave early bag’ permanently prepared, for example in the event of a cyclone, flood, or emergency admission to hospital, may increase the likelihood that such a measure would be adopted and maintained. This idea is explored in more detail in Chapter Thirteen (General Discussion).

Table 39

Perceived Barriers of the Well Prepared

Climate/Weather Conditions	Other Priorities
(You also mentioned that...since going to the forum ...there was a feeling within the community that you wanted to do more but it was just a matter of someone sort of putting their hand up and running with it (that's true), has anything happened with that?) No...it's a funny thing I mean I know it's summer time now but because it's so wet, this subject just doesn't seem to get under people's skin until it's hot and dries...and if it was hot and dry right now I'd be very motivated and so would some of the other people in the community but, because it's not it just hasn't gone to bear, gone through winter and you know, hasn't come out of that mindset (Merv from Snug, interview 2, January, 2011)	...spending a Saturday going on a Field Day like that might be, you know, their time's too precious as it is or they may not have been available because they have got a very young family include a new baby and so you know, four children so they if one was working shifts which they, you know, if one of them is the other one isn't sort of thing umm then it just might be physically impossible (Ruby from Bagdad, interview 2, January, 2011)
I think it's you know, it's, and because it's been so wet and the season is so delayed, and etc. etc etc, you know there, everybody, you know we believe what we want to believe, and we'll take any information that's out there that makes it look like it's going to be ok and we'll say 'oh well that's the way it is, it's not the other way' (Maggie from Middleton, interview 2, January, 2011)	*(Window coverings?)* Yes, we haven't got around to it, no *(and again, is it because there are so many other things going on in life?)* yep no, and we haven't got around to that but that's what we had talked about doing and that actually seems yeah like that seems very good thing to do (Phoebe from Snug, interview 2, March, 2011)
I would have done probably a bit more in February if it'd been hotter and windier in February, but it hasn't been...you never know, you could still have fire weather March April depending on if we get dry dries out, before the grass browns, yeah so we have been doing things but we haven't had the days where you've got the smoke in the air, where you've got your nose outside sniffing (Jill from Ridgeway, interview 2, March, 2011)	...(Husband) said to me the other day 'oh we better go and fire it up so you know what you're doing with them' (pump and generator) and then something else popped up and we didn't get around to doing it but yeah, certainly within the next week or two we'll probably look at setting them up (Jackie from Snug, interview 2, January, 2011)
I suspect if we'd had a forecast that had said 'in 3 or 4 days' time, we're going to have a rip-snorter of a northerly wind and 35 degrees', we probably would have sat down and worked it out ['what to take if leaving' plan] but because the summer was so benign, we never got that push (Jack from Ridgeway, interview 2, March, 2011)	I'm just hoping with the damn thesis out of the way I better get a little bit more systematic about preparation (laughs) and stuff as well (Cam from Fern Tree, interview 2, March, 2011)
...just running the pumps and making sure everything works and stuff like that...sort of maintenance and testing which I haven't done yet cause I've I wasn't so sure it's going it was going to be a bad year this year so I've been in fact you know putting it off and putting it off (Kevin from Oyster Cove, interview 2, January, 2011)	...I mean then we had Christmas come up and all this sort of thing and nobody I think has thought about it (Fireguard) really since then, perhaps as the season progresses...people will become more aware of it but at the moment...I would almost say it's the last thing from my mind (Betty from Middleton, interview 2, January, 2011)

These perceived barriers to preparing (climate/weather conditions, other priorities), often provided by those residents who were very prepared suggests that, as well as framing preparedness measures to have additional or 'dual purposes' benefits, so to increase more frequent positive reinforcement of maintain these behaviours, preparation measures adoption should be viewed from an all-hazards, self-sustainable community position. In other words, rather than the different hazard agencies fighting for 'air time' (salience) with residents, as reticence of preparedness adoption is not a bushfire hazard phenomenon being reported in studies of volcanic, earthquake, tsunami, hurricane, and flooding preparedness also (e.g., Rachmalia, Hatthakit, & Chaowalit, 2011; Sagala et al., 2009; Sattler et al., 2002; Siegel, Shoaf, Afifi, & Bourque, 2003; Whitney, Dickerson, & Lindell, 2001), being prepared (regardless of hazard) should be promoted as a fundamental and valued community attribute. Although some preparedness measures are unique to different hazards (e.g., securing tall furniture for earthquake hazards), other adoptions such as having a fire pump, can also be very useful in case of major flood events (and the fact that a community can be susceptible to both is evidenced by the community of Binalong Bay discussed earlier, and Victoria who experienced major bushfires in 2009, and major flooding in 2011). This notion of promoting all-hazard, self-sustainable communities is discussed in more detail in Chapter Thirteen.

Chapter Twelve - When Community – Agency Relationships Do Not Foster Resident Empowerment

12.1 Fire Agencies and Communities

As introduced in Chapter Two, and as alluded to throughout this thesis, the premise of a community engagement approach to fostering increased and sustained levels of community bushfire preparedness, is that agencies provide an empowering setting (i.e., what agencies can do to ensure that community members can achieved desired outcomes under conditions of uncertainty, such as acting as consultants, providing relevant information and resources, building trust), so to foster an environment in which residents can become empowered themselves (i.e., develop problem solving and coping strategies through community involvement and interaction to define and articulate issues, increase sense of community and belonging), and thus build resilience to future bushfire hazards. As such, community engagement is about developing a partnership between fire agencies and their communities.

Reflecting this view is the Australasian Fire and Emergency Service Authorities Council's 2010 position paper, a document "that includes principles for consistent application by member agencies in all Australian states and territories" (AFAC, 2010, p. 3), which explains that:

> Fire agencies' engagement with communities should foster a sense of partnership with and between residents and their neighbours, business owners, land managers, and government in terms of bushfire risk management and response. Fire agencies should encourage people to gain knowledge and skills to enable them to prepare themselves and their property to survive bushfire, and to help them identify the triggers for response when a bushfire threatens.
>
> Collective action by people preparing for and responding to bushfires will invariably achieve better results than individuals acting alone. Fire agencies should support initiatives that encourage and assist members of communities to act together in support of fire management efforts (AFAC, 2010, p. 6).

Accordingly, a key role of the fire agencies, including volunteer fire brigades, is to support and facilitate community initiatives that promote bushfire preparedness and the empowerment of residents to gain the knowledge and skills required to successfully prepare themselves for bushfires. However, throughout the present study, and reflected by information sources including interviews, surveys, questionnaires, and informal conversations, were examples of community and fire agency relationships that did not foster trust and empowerment. Rather, as this section will demonstrate, the relationship and the lack of partnership between these two parties often resulted in residents feeling mistrust towards, and disempowered by, their fire agency. The following extracts from interviews with participants indicate that the position ascribed by AFAC above is not always supported and reflected by the fire agency.

This section provides examples of community and fire agency relationships that do not foster trust and empowerment. The communities, the residents, and the fire agencies members shall remain anonymous for the sake of protecting the individuals involved. The importance of reporting examples of disharmony between fire agencies and their community is that although the aim of this thesis is to provide

practical guidelines more effective community engagement initiatives, unless fire agencies and their volunteer bodies embrace this approach, and engage with their communities, the goal of promoting and sustaining community bushfire preparedness will not be achieved.

Although this section reports on the disharmony between fire agency representatives and residents of only particular communities, anecdotal accounts collected by the researcher from other members of communities in Tasmania (and other states) suggest that this is not an exceptional situation. The benefit of studying examples of dysfunctional agency/community relationships is that they provide invaluable insight as to why certain communities, or certain members of communities, do not engage with bushfire education material. As the characteristics that constitute a 'good' or 'bad' agency/community relationship do not lie on a continuum, it is just as important to study poor examples of this interaction so to identify how to avoid it in the future. Although the below examples are presented as isolated incidents, many have come from the same community. Presenting these examples as isolated cases, therefore further protects the individuals involved.

Example 1. Following the 2009 Black Saturday bushfires a bushfire awareness meeting was held in Community A's local hall. At this meeting, the volunteer fire brigade expressed how it was always welcoming new members to increase its capacity to respond to fires. At the next brigade meeting, a number of women attended to find out how they could assist. These offers however, were discarded. Resident A explains:

> ...after we had our first fireguard sort of meeting...along to the next meeting of the brigade came half a dozen women who were prepared to, a couple of them would have done training and fought as fire, the others were really good with computers and really good with other stuff and they were there, and look, they just got ignored...their resources wasn't (sic) taken up, the boys' club doesn't want it...

This fire brigade was thus not very interested in establishing a partnership with these members of the community and did not foster an empowering setting in which these women could develop new skills and strategies to help empower them to collectively address a community issue (bushfire threat).

Example 2. When asked why there seemed to be a growing disinterest in Fireguard in their community, Resident B explained that since a recent bushfire meeting in Community B, where the agency representatives were not able to provide appropriate answers to the community's questions, residents had become despondent with any pro-bushfire preparedness initiatives. Resident B explains:

> ...one of the reasons a couple of people dropped off and one of the grumblings from them...the last meeting we were at...the fire service person spoke about the trees on the road and how they weren't responsible for those trees and neither were the council responsible for those trees...and I thought 'oh, goodness me, everyone's palming on responsibility here' …

This example demonstrates that by not being able to provide relevant and useful answers to their questions, the community has come to mistrust the fire agency and therefore disengaged from any of its programs. By not being able to provide information deemed by the community as important for facilitate their community's preparedness (articulating problems), the fire agency has not provided

an empowering setting from which a positive partnership between the two parties can develop.

Example 3. Two residents from Community C (also volunteer fire brigade volunteers) decided to make a Community Bushfire Plan for Community C following the Black Saturday bushfires in February, 2009. The plan developed from the findings and recommendations of the Victorian Bushfire Royal Commission Interim Report and was based on the premise that 'A plan is better than no plan'. This Bushfire Plan was a very detailed accounting for all levels of the community (including fire brigade, fireguard, hall committee etc.) and was revised after a meeting was held to consult with the rest of the community. Negotiations had also begun with the fire agency to gain more formal recognition or approval of the Fire Plan for Community C. However soon after, the two residents were told by the fire agency that the fire plan would not be approved by the fire agency and that creation of such a Fire Plan was the role of the fire service itself. As such, an attempt by Community C to design and implement a fire plan specific to their community was quashed, and with it the opportunity to provide an empowering setting to empower Community C's residents to become self-sufficiently prepared.

Example 4. Resident D, a volunteer fire brigade member, wanted to organise a Fire Expo collaboration with the Fireguard subcommittee of Community D. The aim of the Expo was to hold a more practical, hands-on bushfire education session, rather than the traditional 'talk fest' information evening. It was the volunteer's intention to have fire pump demonstrations on an actual burning car, fire blanket demonstrations, as well as other practical demonstrations. After a meeting with the local chief and field officer, the volunteer was informed that the Expo would be run by the fire brigade, not Fireguard, although they could organise the promotion of the

event through their ‘channels’. Furthermore, no live fire was to be used as this was an occupational health and safety risk, and the chief and field officer would personally coordinate (i.e., MC) the event (disempowerment). Resident D expressed:

> ... and this is why I got so upset on that day, because you know the two of them stood up there like stuffed dummies um and making it more about themselves than anything else, when they don’t, they don’t actually give enough active support to local people, I mean fireguard can be a great asset for the community and it would be much much more successful in my view if the local brigade was right behind it and was proactive in helping people to prepare their places properly ... I mean they could even turn it into training sessions for themselves you know, helping people to burn off and prepare their properties and showing them how to prepare their properties and stuff and they could devote a bit of time to it...

The Expo went ahead however, what was intended to be a practical, hands-on session was begun with a 90 minute verbal presentation of bushfire safety and preparedness. Many residents voiced their disappointment following the Expo that it had not been as hands-on as advertised and that chairs could at least have been provided during the talk (mistrust).

> ...yeah, it was a day thing where they had a barbeque afterwards and...had demonstrations...but erm we had to leave early cause um um we were going somewhere else...but I couldn’t stand for too long anyway, chairs would have been more comfortable (laughs)...

At the conclusion of the 90 minute bushfire talk, the chief explained to residents that the Expo was a new approach to delivering practical bushfire information and that if they wanted ‘just bushfire information, the same as last year’, there was an information night being hosted by the fireguard subcommittee of a neighbouring community in their community hall the following weekend. In a conversation with the organiser of this event, who was in attendance at the Expo, she

expressed her frustration at the chief's manner of announcement and explained that it was due to such promotion that she was finding it difficult to motivate her community to continue to attend bushfire education events. What this meant in practice was that this fire agency not only disempowered members of its own community, creating a feeling of mistrust amongst its residents in the process, but also managed to disempower a community leader of a neighbouring community.

The chief announced at the conclusion of the day that next year they would endeavour to have a live fire demonstration as this would be very useful learning tool for the residents. The chief and field officer deemed the Expo a great success.

Example 5. Resident E, a female resident of Community E, was an auxiliary member of Community E fire brigade and acted as the liaison or contact person between the brigade and the local fireguard groups. She and another resident had even offered and trialled making ready-made frozen meals for the local volunteer fire fighters to support them during fire event days. However, due to a clash of personalities/community politics she found herself 'resigned' from the brigade:

> There...seems to be, and I gather is a state-wide problem, it's not just our brigade, ... they seem to have lost ... lost the idea of (laughs) what it's about , ... it seems to me that we should be two community organisations working hand in hand, you know I got sacked from the brigade, well I got resigned ... I got a letter from [fire officer] you know 'thank you for your help in the past, you know, we accept your resignation would you please, you know, hand in any uniform...and I discovered it finally on the day of the [fire meeting] that it was [the brigade chief] who did it...and he said to me 'well you hadn't been to the fire shed for a year, you know, you hadn't been ... he knew that I was in contact, he knew that I wanted to be a liaison person between the brigade and ... the fireguard umm and...he just went ahead and resigned me without, because I hadn't been to meetings, I never went to meetings, unless it was just to discuss a fundraising thing or a thing like the [fire meeting] I mean why would I go there and hang around with the boys, I wasn't training ... I wasn't a member of the brigade in that sense, so you know, what was that about? ...I was obviously a thorn in the side ...why not use me as a

> resource...[I] was never was going to be a fire fighter, I mean how can ... but you know, like [other resident] and I did that thing umm ... of preparing food boxes for them and having them in the freezer so when they got called out they could, you know, that all went nowhere, someone complained about it, you know like ... all you'd have to do is if you thought a fire was serious enough that you were going, you'd have to ring up [Resident E], [I would] organise so that there's some food within a few hours, that will get to you, you know like, (laughs) I, they're so short sighted, they're just so caught up in their own stuff, they don't actually really think about a big fire, not really, you know they run off to their pissing little paddock fire somewhere or you know...

` Resident E suggests that this resistance to engage with the community and support community preparedness initiatives may be a result of a reluctance of the brigade to give up a supposed 'power'. This stance, as Resident E explains, inhibits the formation of a positive partnership between the community and the fire agency, and establishes a culture of mistrust and disempowerment between these two parties within this community. Such a culture does not foster community resilience to future bushfire hazards:

> ...their minds aren't allowing them to think about the bigger picture about exactly what resources you might need in the situation like that [catastrophic fire], like food for example, like umm people to man the phones, why can't there be people in the brigade, who aren't active fire fighters by know the radio system back the front and can be there to man that, while an active fire fighter can go out and do something useful about the fire...there could be at least half a dozen people in the brigade doing those ancillary jobs...I think it's the boys keeping the jobs close to their chests, I don't know why they need to feel so threatened by the you know, maybe gives them a feeling of power? I don't know, it's all so pissing (laughs) I mean really it's you know, get out in the real world where you know, power mean something else, they irritate the begeebers out of me, I'm glad I'm not in the brigade anymore...

Example 6. The precarious relationship Resident F, of Community F, has with his local fire stemmed from their provision of inaccurate information:

> I think there's a lot of misinformation going around too that needs to be clarified. There are, we had, [local brigade member] down here wrote us a letter to say when it's catastrophic you've got to leave, well I questioned him and said 'well, whose and what authority?' he said 'you've got to leave' and said 'but hang on a minute, that's your opinion, what authority, what legislation says that I must leave my property?' and he said 'oh, it's common knowledge' I said 'no it's not, there's no law, you think you've got a law', I've got a mate who's a layer...

While trust has been found to be an important factor in situations where there is low familiarity/low information (Paton, 2008) (see section 3.1), and was thus found to be less important by the Model (Figure 6) in the present Tasmanian sample due to the relative frequency, albeit not life-threatening, of bushfire events, it is evident that experiences that foster mistrust prevent the development of effective partnerships between fire agencies and their communities. Furthermore, it provides further support for previous research (McIvor et al., 2009) which suggests that trust and mistrust do not lie on a continuum and are thus influenced by different processes.

Resident F's discontented relationship with the local fire brigade is further extended to the larger fire agency:

> I'm very annoyed at is that the [fire agency] err never responded to my letter asking the question about whether they'd take water when they need to take water off properties err could we put a umm 'no' take water out of a certain water hole on properties and they've not responded to that actual question so I've had some legal advice from the sense of basically the sense or in words are telling me that umm cause I wrote to them, and if they do take my water, umm it won't be a [fire agency] because I'll sue the arse off it and the Government because yeah, I've done everything in my power to help control

> my end of things they rave about you know, being prepared and all that but I believe the [fire agency] is not prepared itself to know what to do, where to get things, and what it needs to do... This point needs to be entered, I mean the Chief of the fire brigade has still never responded to my letter, umm which really annoys me, I have a copy of the letter and one day there will be a big fire and...I'm going to give it to the media and say 'guess what?' these people don't do err they talk about it but they don't do anything about it, they need to be true to themselves and true to their word...

Although one of the keys role of the fire agency and their local volunteer fire brigades is to engage with and support the communities in their endeavour to become collectively more prepared for bushfire (AFAC, 2010), the above five examples demonstrate how diffusion/confusion about responsibility, poor communication, miscommunication, mistrust, disempowerment, and reluctance of change contribute hinder this and instead foster dysfunctional relationships between the fire agency and their communities. Example 1 and 5 above demonstrate how members of a community, in an attempt to support their local fire brigade and spread the responsibility of community fire protection amongst its residents, were met with limited enthusiasm and attempts to positively change/evolve the brigade were arguably forcedly ousted (i.e., 'resigned').

Such resistance to change or delegation of responsibility not only results from communities' attempts to engage with their local brigades, but even brigade members themselves, in an attempt to instigate positive change within their own communities are met with resistance from the formal fire agency itself. Example 3 demonstrates how two volunteer community fire fighters developed a community bushfire plan due to the lack of something more formal, and although community feedback had been sought and negotiations had begun with the fire agency to improve and approve the plan, the fire agency informed the two volunteers that it

was not appropriate for them to be devising such a plan, something that should only be handled by the fire agency itself.

As a result, rather than work with and empower this community to develop their own bushfire plan and thus promote the community's bushfire preparedness, the fire agency (inadvertently) disempowered the community and the two volunteers and subsequently reinforced that communities' bushfire preparedness is the responsibility of the fire agency. This suggests that the fire service have a lack of cultural experience or knowledge of how to empower communities to prepare. Even initiatives between the local brigades and their community's Fireguard groups, which reflect the community engagement principles discussed in earlier chapters, are met with resistance by some members of the fire agency who are more comfortable with the traditional approaches to bushfire risk and preparedness education. Example 4 provides an illustration of this.

The reluctance to evolve and adopt positive change, and the comfort many fire agency members feel in upholding the traditional operational culture of the fire brigade, also manifests in the way bushfire risk information is communicated. Residents in Example 2 for instance voiced their frustration and disgruntlement with fire agencies and other agency representatives who suggested during an information session that it was not their responsibility to address the bushfire hazard of trees along the roads. The result of not being able to provide adequate answers to articulated problems, and rather shifting the blame, resulted in residents feeling mistrust towards the fire agency.

Unfortunately, the outcome of this disagreement surrounding bushfire safety and resultant mistrust towards the fire service was that the residents of this

community disengaged from other community bushfire preparedness initiatives like Fireguard. This authoritarian style of communication popularly employs fear-promoting messages, falsely assuming that they will promote the bushfire preparedness of residents. However, the messages and how these messages are communicated to community members, most often through the means of the local bushfire brigades, may be a result of poor communication from further up the fire agency hierarchy. How much importance for example, do the fire authorities place in ensuring that their volunteer fire brigade members, these community members on the frontline of providing their community with bushfire related information, have accurate, up-to-date information? Are these volunteers taught how to effectively communicate this information?

Regardless of whether poor communication or miscommunication is a result of culture stagnation or poor communication flow from higher up the hierarchy, the way this information is perceived by the community has the same negative effects. Example 6 provides an example of how misinformation from a local volunteer resulted in the value of the volunteer fire brigade's information being questioned by the receiving resident, and further attempts to engage with the formal fire agency body resulted in the resident feeling disrespected which further reduced this resident's relationship with the fire service. This example further highlights the importance of fire agencies not only interacting with their communities, but that the quality of this interaction promotes partnerships built of trust and empowerment. This further highlights the importance of shifting from an authoritative information dissemination approach toward community education, to one based on community engagement principles.

These six examples demonstrate that within certain sectors of the fire brigade there is a great reluctance or uncertainty in evolving or changing the operation, top-down culture of the fire brigade. This culture, and the resulting communication means and messages, can result in mistrust and residents disengaging from otherwise important information, reducing the likelihood that future information provided by this source, the fire service, will be attended to. Furthermore, attempts by volunteer fire brigade members, community members, or a collaboration of both parties, to facilitate and foster increased bushfire preparedness through community engagement, has, unfortunately in many instances been met with opposition and even confrontation in some communities.

Whether this is a result of a conscious decision to maintain the traditional operational top-down culture of the fire service, the naive modelling of this traditional archetype by its volunteers, or the failure of new methods and approaches (e.g., 'shared responsibility', community engagement, effective communication skills), adopted by the fire service, to filter down to the front line, the volunteer brigade members, is unclear, and beyond the scope of this present study. What is clear however is that the efficacy of the community engagement approach, presented in the earlier chapters, to promote sustained community bushfire preparedness behaviours, relies on communities and agencies engaging in reciprocal and complementary ways, and developing partnerships built on trust and empowerment.

However, for this to be realised fire agencies need to recognise the value of such an approach, allocate resources to allow it an opportunity to work, and ensure volunteer fire brigades are educated and supported to adopt it. The challenge this resistance poses, how it may be overcome, and a recommended 'transition phases'

from the traditional approach to a community engagement approach will be discussed in Chapter Thirteen.

12.2 Other Agencies and Communities

A seemingly more complex relationship to account for when trying to foster community bushfire preparedness is the relationship between other agency bodies and the community. For example, although councils, the Parks and Wildlife Service, and forest management bodies (e.g., Forestry Tasmania) are not obviously related to communities' bushfire preparedness, due to their, in many instances, representing substantial landholders themselves, their relationship with communities can often provide significant obstacles to achieving community bushfire preparedness.

As discussed in the results of the telephone interview data (see section 11.2), perceived barriers to preparing are often complex and seemingly unrelated (e.g., weather/climate conditions, other priorities) to what is viewed as conventional bushfire preparedness limitations (e.g., cost and time limitations; Lindell & Whitney, 2000; Motoyoshi et al., 2004). The below extracts from interviews with residents highlight some of the challenges agency/community relationships proffer in terms of property owners' ability to mitigate bushfire risk.

Sarah from Fern Tree explains that before she obtained a 'seasonal pass' to burn off, it was too difficult to get permission to burn off:

> ...what happened for was like I had to contact the council then the fire brigade then the council then the fire brigade, it was about five calls and then they'd try to come down and have a look and see if it was ok to go and then we had to ring them up to see if it was alright to finish and then if you only burnt one square metre it was ok, but only in fire brigade season, in umm in the season you know, so we had that sort of hassle happening so now it's ok to burn off...

Sandy and Gus, two very prepared Bracken Lane residents of Fern Tree were limited by tree felling contractor:

> ..no, they're still there [four trees on northerly aspect] because the tree bloke, he's let us down badly, he was going to come and yeah, remove them but they're still there (*that's annoying*) yes, yeah, I mean we've cleared away a lot, yeah...

James from Binalong Bay explains that since his local council has applied a fee to the green waste tip, he has refused to go and has relied on burning off on his own property, but that this is inconvenient as he is only allowed to burn off one cubic metre at a time:

> ...and I said to the CEO at the meeting, I don't use it anymore [green waste tip], so I'm starting to burn off here, they burn it off anyway [green waste workers], so I started to do a lot of burning off here, which means, you know, cutting and carting and burning, you're only, you're only allowed a cubic metre at a time, to burn, mmm...

Clint from Bagdad expresses his annoyance with the insurance companies for not providing a discount or incentive for people who have spent money of bushfire preparedness measures to increase safety and value of property:

> ...I'm getting a little bit of a discount, it's not a huge discount, but, what's annoying me the most is the $700, it's nearly $700 a year to keep it registered [makeshift fire truck], yeah, and the point is, and I admit I use it to cart a bit of soil for the garden or something like that, it's got other spin off areas but, surely that should be my bonus for what I've done, there's no incentive from the Government, I've asked the question you know, can't we get a special registration to say you can go 50 kilometres down the road or you know, you can use it 10 times a year or something like that?

Similarly, Kevin from Kettering suggests:

> ...it would be really good to get a better a err, a better insurance umm rebate due to all the things I've got on the house than what I get, which is nothing (laughs)...

These examples demonstrate the subtle, disempowering, and often complex effect different agencies, not often associated with fire preparedness, have on residents' (perceived) ability to prepare for bushfire. The seeming obstacles imposed by these agencies reinforce the 'preparing is too hard' mentality often adopted by residents and further reinforces the externalisation of responsibility when preparedness efforts are attempted by residents but agency 'red tape' gets in the way resulting in residents feeling that they 'tried to do right thing and look what happened?!'. This perceived agency imposed barrier of preparing being 'too hard' is re-visited in Chapter Thirteen.

Although the task of getting all these agencies to engage with the communities and each other to empower residents to foster greater community bushfire preparedness appears a daunting challenge, merely acknowledging the complexity of these agency/community relationships, and their effect on individuals' ability to prepare will go a long way to assisting communities become more prepared for bushfires. This therefore suggests that when working with communities to help build their capacity to mitigate bushfires, an understanding of their various issues and potential barriers to preparing is essential to be able to effectively problem solve. For example, in James' case, without this seemingly unrelated bit of information about newly implemented green waste fees, any assistance in motivating the community to form, for example, working bees to help neighbours clear their properties, may not be sustainable as the underlying issue of being able to get rid of

the green waste produced (i.e., limitation of being able to only burn one cubic metre at a time, and fees imposed on green waste tip) has not been addressed.

As such, to ensure community bushfire preparedness is sustainable, exploration of and an understanding of the auxiliary, and often ignored, community relationships with other agencies is necessary. As each community has a unique profile and relationships with different government bodies (e.g., Forestry, Parks and Wildlife, Reserves, Trusts etc.) the community must be engaged and consulted to be able to understand just what their relationship is with these agencies, and the sort of barriers and limitations such relationships may impose. Without the opportunity for a collective community discussion of such issues and potential barriers, an opportunity to articulate their issues, other community residents may remain unaware and not appreciate that these issues contribute to them not preparing.

How these complex community/agency relationships can be acknowledged and addressed by community engagement initiatives was demonstrated by the Pilot (Chapter 9). Due to the understanding that other non-fire agencies play a significant role in residents' perceived ability to prepare, the Community Development Officer invited representatives of relevant government (and none government bodies) to attend the community Forums. In many cases, prior consultation with the community had revealed unresolved issues with one agency or another.

For example, in Snug, residents had indicated discontent with the local council and their apparent lack of attention to overgrown local verges and trees overhanging the road. The community Forum allowed the residents to voice such concerns (articulate problems) to the council representative who then suggested that she could come and do a walk around sites of interest with some of the residents.

The ensuing ‘walk around’ was incorporated into a Field Day on the 13th March, 2010 and was attended by 17 residents. The attendance of the council hazard reduction officer was well-received as her detailed explanation of the council’s hazard reduction program and how residents could comply with the council’s by-laws dispelled any uncertainty and anger residents may have had of these processes due to their lack of understanding. The hazard reduction officer also explained that due to the council’s limited resources, community residents could help them by ringing and informing the council of tree limbs overhanging roads et cetera. This is an example of how agencies can provide an empowering setting by providing useful answers to articulated problems, and thus provide the community members with the resources to allow them to effectively solve these problems. This reinforces the notion of bushfire preparedness being a shared responsibility between community members and agencies, and quells the ineffective and often toxic blame-game. Such engagement initiatives also help develop positive partnerships between the residents and the agencies, thus facilitating the foundation of an empowering setting, which empowers communities to become resilient to future bushfire events.

Chapter Thirteen – General Discussion

The findings of the present study provide a novel contribution to hazard preparedness literature by demonstrating the important antecedent role of residents' place attachment in their bushfire preparedness decision making. The nature of individuals' value judgements about the environment in which they live were found to not only to influence the way they perceived bushfire risk and thus what to do about it, but also their relationship with other members of their community and agency representatives. This study therefore demonstrates that in order to effectively engage with communities and promote bushfire preparedness, agencies must acknowledge and tailor their communication approach and content to accommodate residents' place attachment values.

While place attachment was found by the study findings to represent an important motivational precursor in residents' decisions to prepare for bushfires, a sense of social responsibility was identified to act as catalyst for many residents who felt they should prepare, to actually adopt preparedness measures. The novel contribution of social responsibility acting as a link between residents' good intentions and actually adopting preparedness behaviour thus supports the present study's supposition that individuals do not make preparedness decisions in isolation of their social environment.

The importance of residents' social relationships in influencing preparedness behaviour was found not only to be influenced by other community members, but just as importantly, by agency representatives. The nature of the interaction between agencies and community residents, and its ability to foster trust or mistrust, empowerment or disempowerment, was demonstrated by the present study to play a pivotal role in influencing residents' bushfire preparedness behaviour. This finding

thus provides a novel contribution to hazards research by highlighting the fundamental importance of the quality of the community/agency relationship in promoting community bushfire preparedness. Through the action-research component of the study, and by applying these novel findings (presented in the New Conceptual Social Attachment Model of Bushfire Preparedness presented later in section 13.1), the present research demonstrates the efficacy of adopting a community engagement approach to promoting community bushfire preparedness; thus bridging the all too common theory-practice divide of hazards research.

The study's findings have therefore demonstrated how bushfire preparedness theory can be applied to inform more effective community bushfire preparedness initiatives. The theoretical component of the study demonstrated that elements of the community members' physical and social environments in which they live and work (i.e., place of attachment, family, neighbours, community groups, social networks, workplace) play a significant role in accounting for differences in the level of actual preparedness for bushfires. In Chapter Six the Social Attachment Model of Bushfire Preparedness was tested on data collected from a sample of Tasmanian residents living in bushfire risk areas.

This Model (Figure 6) provided evidence that when faced with the potential risk of bushfires, people's decisions regarding whether to prepare or not are greatly influenced by the value judgements they hold for the place in which they live. The important influence of this variable was supported by qualitative data obtained from telephone interviews with residents living in bushfire risk areas, and further suggested that this sense of belonging or personal identification residents feel towards a setting and/or natural environment, influences how residents choose to manage the perceived risk and with what resources they chose to do so. This finding

provides a new research avenue with implications for developing a more effective approach to risk communication. This finding will be discussed shortly.

Furthermore, both qualitative and quantitative components of the study provided evidence to suggest that when faced with such uncertainty, people utilise community capacities (i.e., psychological sense of community and community involvement) that have developed from their everyday experiences rather than any specific training in bushfire risk management. Telephone interviews with residents confirmed the important role of family, friends, and other community members (including 'firie friends'; Chapter 8, Table 27) in influencing attitudes towards bushfire preparedness and providing information and resources allowing them to effectively problem solve. These community variables were identified as mediating the relationship between the attributes that people attach to bushfire preparation and the goals that people wish to attain, and thus highlight the fundamental role of residents' social environment in interpreting hazard risk and preparedness information.

The findings of the present study also provided important information regarding how the relationship between community members, and between community members and bushfire management agencies, influence community risk management. The quantitative analysis revealed the important role responsibility played in mediating the relationship between agencies and community members. This was supported by the qualitative analysis which found that residents' sense of individual responsibility for preparing prompted them to form intentions to prepare (see Figure 6 – Model). Interestingly, and in support of previous findings (McIvor et al., 2009), the qualitative findings suggested that residents' feelings of responsibility for the welfare of others, and not just themselves, influenced their interest in and

adoption of actual preparedness measures. This sense of social responsibility is discussed in more detail below.

The Social Attachment Model of Bushfire Preparedness (Chapter 6, Figure 6) provided a theoretical foundation for developing a more effective and sustainable community bushfire preparedness education program. Qualitative data obtained from the Bushfire Preparedness Questionnaire revealed between-community differences on key variables presented in the Model (intention to prepare and actual bushfire preparedness) highlighting the uniqueness of each community and thus confirming the need to engage every community on a 'case-by-case' basis and the inability of applying a 'one-size-fits-all' model of community engagement to at-risk communities to promote bushfire preparedness.

Chapter Nine provided a summary of the action research/applied component of the study where the collaboration between the researcher and the Tasmania Fire Service (TFS) Community Development Officer saw the application of the theoretical components of the study to the TFS Bushfire Ready Communities Tasmania Pilot. This Pilot, adopting community engagement principles, developed a number of effective templates that can be used fire agencies and community groups alike to organise more effective community bushfire preparedness initiatives. These templates included a Forum, Field Day, Women's Bushfire Workshop, and Bushfire Ready Neighbourhood groups.

Another important finding of the present research, and one that supports previous research, was the finding that women were significantly less prepared than men, and were more likely to decide to leave early, but had adopted limited preparedness measures to allow this. To address this clearly concerning finding, the

applied component of the study developed and trialled a Women's Bushfire Workshop in an attempt to provide a more effective bushfire education format. Results and implications of these findings will be discussed later in this chapter.

The successful application of the theoretically-derived approach adopted here, however, such as the templates and initiatives developed in the Pilot, rely on fire agencies believing in the efficacy of the community engagement approach, the utility of community bushfire preparation being more effective than increasing response capabilities, and that these values are passed down to the volunteer fire brigades who represent the front line in the bushfire agency/community interface. The existing obstacles that must be overcome for this to be realised, and how this study's findings can help facilitate this will be discussed subsequently. The chapter concludes with a summary of the implications of the present study, direction for future research, and identified limitations of the current research.

13.1 New Conceptual Social Attachment Model of Bushfire Preparedness

By way of demonstrating the key findings of the present research, incorporate the mixed-methods results of previous chapters, and produce a coherent final outcome, a new conceptual Social Attachment Model of Bushfire Preparedness is presented (Figure 11). This new conceptual Model combines the Social Attachment Model (Figure 6), determined through the structural equation modeling analysis of data obtained from Tasmanian residents living in areas at-risk of bushfire (Chapter 6), with the qualitative findings obtained from conducting thematic analysis on telephone interview data from this same sample of residents (Chapters 8 and 11). As such, the key cognitive and social factors, determined by the present study to influence residents' adoption of bushfire preparedness measures are presented in one simple conceptual model.

This conceptual Model (Figure 11) describes how individual (place attachment, outcome expectancy, and individual responsibility), community (sense of community, community involvement and social responsibility), and agency (empowerment and trust/mistrust) factors interact to influence residents' decisions to prepare or not prepare for bushfires. The position of these factors in Model is important as it describes the sequential order in which these factors and interrelationships influence residents' decision making. The interrelationships between these individual, community, and agencies factors, depicted in the Model (Figure 11) as the 'individual/community interface' and the 'community/agency interface' represents critical phases in residents' bushfire preparedness decision making process and influence whether or not preparedness measures are adopted. This conceptual Model, and many of the factors and interrelationships it describes, provides a unique contribution to hazard preparedness research. The following sections thus provide a discussion and summary of how the novel findings of the study (portrayed in **bold** in Figure 11), constructs found to motivate, influence, and/or hinder residents' adoption of bushfire preparedness measures, interact with the variables described in Chapter Two, and determined by the Social Attachment Model of Bushfire Preparedness (Chapter 6, Figure 6,), to predict residents actually preparing for bushfires.

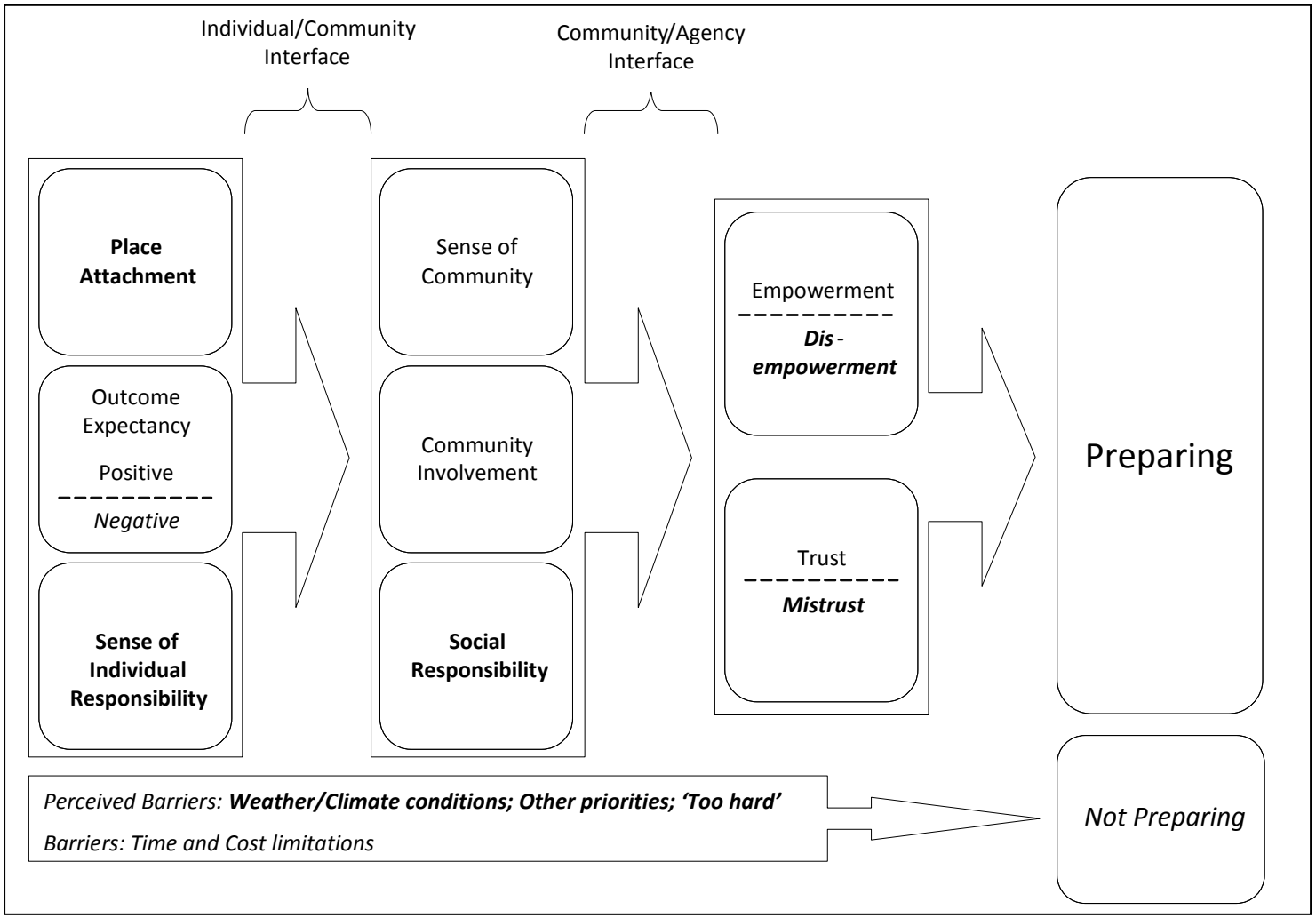

Figure 11. New Conceptual Social Attachment Model of Bushfire Preparedness (new variables highlighted in **bold**; factors that facilitate decisions not to prepare highlighted in *italics*).

13.1.1 Place attachment

A major finding of the present study, supported by both the quantitative and qualitative components of the research, was the significant influence of residents' attachment to the place they lived on their decisions to adopt bushfire protective measures. This finding thus provides a novel contribution to hazards research and especially the field of risk communication which traditionally sees people, the consumer, as independent of the context. That is, current practices of risk communication assume residents are passive receivers of information and will thus act on risk information and advice without interpreting it through other cognitive and social filters. As discussed in earlier chapters (see sections 2.6, 6.1, and 7.3.2), this assumption has consistently been found by hazard research not to be true. The important antecedent role of place attachment in residents' bushfire preparedness decision making is highlighted in the conceptual Model (Figure 11) with its position at beginning (left side) of this process.

While the Social Attachment Model of Bushfire Preparedness (Chapter 6, Figure 6) demonstrated place attachment's motivational role of promoting residents to adopt bushfire preparedness, the qualitative component of the study highlighted the complexity of this variable. Telephone interviews with residents provided further insight explaining how such place attachments can hinder the adoption of bushfire protective measures due to residents' reluctance to modify that to which they feel so attached. The importance of this factor in hazards research is the unique occurrence of residents consciously choosing and desiring to live in an environment which represents the risk. This would be like someone deciding to live on an active volcano because they liked the view it offered. As such, understanding the role of place

attachment in bushfire preparedness decision making has important implications for more effective bushfire preparedness education programs.

Defined in Chapter Three (section 3.1.1) as the strong bond or association an individual feels for a particular physical environment and the elements within it, place attachment is also recognised to constitute a part of the individual's identity by helping answer the 'who am I?' question by answering the 'where am I?' question (Williams & Vaske, 2003). In fact, when asked why they had moved to the area they now lived, every resident interviewed explained that it was due to the area's natural environment and the lifestyle this afforded them, rather than the proximity to amenities (e.g., school, work, public transport, shops). To protect such a valued environment, their ability to enjoy it, and the component of their identity it defines, it was predicted that residents holding high attachment to place values would be more likely to believe in the efficacy of adopting bushfire protective measures.

This was supported by the Model (Chapter 6, Figure 6). However, the type of mitigation strategies adopted by people with a high attachment to place was a function of people's perception of the consequence of these measures' effect on the natural environment. As such, and consistent with other research (Brenkert-Smith et al., 2006; McFarlane et al., 2011; McIvor et al., 2009; Paton, Bürgelt, et al., 2008), residents felt preparing for bushfires was a challenging 'balance' between the costs (high value rather than monetary) of adopting protective measures (e.g., reducing vegetation and impacting on the valued aesthetic qualities of the place) and the benefits of reducing potential bushfire risks. This finding thus further highlights place attachment's role as a vital antecedent of the preparedness process. As a way of combating this cognitive dissonance, residents with high place attachments more frequently adopted measures which did not impact on the natural environment but

rather acted to protect it. For example, Garry from Scamander installed sprinklers and planted more exotic tree species around his home to mitigate the bushfire risk.

For other residents, the cost of adopting bushfire preparedness measures that modified their valued natural environment was perceived to outweigh the benefits of reducing the negative consequences associated with a potential bushfire hazard. As such, their attachment to place reduced the likelihood of their adopting mitigation and preparedness strategies. Furthermore, as discussed in section 8.3.1, this view may have resulted in the perception that bushfire hazard reduction strategies are inflexible prescriptions that spoil the natural environment they so highly value, and thus they are unlikely to attend to or act on current and future recommendations by the fire agencies. Therefore, by recognising this fundamental antecedent role of place attachment and how it might affect how residents perceive traditional risk communication and education, fire agencies, through a community engagement approach, could confront these beliefs and look at ways of surmounting them within the risk management program.

For example, during a Pilot Field Day in Binalong Bay (whose residents have high attachment to place values), rather than insisting that residents maintain a cleared 30 metre radius around their home (as is the formal recommendation by the Tasmania Fire Service and thus a message that was expected by many residents; see section 8.3, Table 17), the TFS District Officer explained to residents that they could keep their treasured trees, even the ones close to their house, as long as branches were not overhanging and that ladder and fine ground fuels were cleared. The District Officer continued to emphasise that bushfire safety need not undermine or be incongruent to environmental values by explaining that big healthy trees and fire resisting plants can absorb heat from approaching bushfires, trap burning embers,

and reduce wind speeds near the home if correctly positioned and maintained (Tasmania Fire Service, 2010). By acknowledging residents' place attachment values and focusing on preparedness recommendations that are congruent with this view, residents' beliefs that bushfire preparedness adoption spoil the landscape can be dispelled and increase the likelihood that these, and future recommendations, will be adopted.

The Model findings (Chapter 6, Figure 6) that attachment to place is an important precursor of psychological sense of community and community involvement further highlights the decisive influence of place attachment in the bushfire mitigation decision making process (illustrated in the conceptual Model, Figure 11). Although place attachment has been recognised by other hazard preparedness studies as an influencing factor in this process (e.g., Cantrill, 1998; Eriksen & Gill, 2010; Jakes, Kruger, et al., 2007; Martin et al., 2009; Paton, Bürgelt, et al., 2008), the present study offers novel insights into just how important this construct is as a precursory and motivational factor in the decision making process. As such, to ensure the efficacy of their risk communication and education initiatives, fire agencies must acknowledge and become acquainted with the role of individuals' and communities' attachment to place and modify their content and mode of communication accordingly. This study argues and has demonstrated (Chapter 9; discussion of Pilot follows in section 13.2) that one of the most effective ways of achieving this is by adopting a community engagement approach. Such an approach, through community consultation, engagement, involvement, and resultant rich knowledge of and respect from a community that ensues, will allow fire agencies to develop and implement more effective bushfire preparedness programs that account for that community's place/environment of attachment.

13.1.2 The individual/community interface: Perceived barriers, individual, and social responsibility

While place attachment was found to be a fundamental precursor to the bushfire mitigation decision making process and stimulus for social processes (including psychological sense of community and community involvement), sense of personal responsibility for bushfire preparedness was found to be an important mediating variable between individual and social level variables, and intention to prepare for bushfires in the Social Attachment Model of Bushfire Preparedness (Chapter 6, Figure 6). Telephone interviews with residents provided further support for this finding with 32 out of the 34 residents interviewed suggesting that it was their responsibility alone to ensure that they were prepared for bushfire. This may reflect a sample bias as these participants were mainly recruited from community bushfire information nights suggesting perhaps a desire to obtain bushfire preparedness information so that they might make more informed choices regarding their bushfire preparedness strategies.

This finding however highlights the importance of future risk communication and preparedness education emphasising that preparing for bushfires is a 'shared responsibility' and due to the limited resources of the fire agencies, householders best chance of reducing the negative consequences of bushfires is to become self-sufficiently prepared (i.e., independent water sources, fire pump, multiple means of obtaining warnings – radio, community telephone tree, understanding of bushfire predictive weather). The essential role of sense of personal responsibility is thus illustrated in the conceptual Model above (Figure 11).

The important finding that not all of the residents interviewed were adequately prepared for bushfire (e.g., many intended to buy a fire pump, clear

vegetation, or leave early but had not prepared to do so) suggests that sense of personal responsibility only goes so far to prompting actual adoption of bushfire preparedness measures. Constraining variables to actually adopting mitigation measures identified in the interview data included cost of adopting preparedness measures and time restraints. The longitudinal data presented in Chapter Eleven even suggested that residents who had previously indicated being very prepared were prone to perceived barriers.

The longitudinal component of the study, consisting of re-interviewing residents one year after their initial interview, made it possible to determine whether reported intentions to become more prepared/adopt new measures had in fact been acted on, and if they had not, why they had not. Results of these interview data provided the interesting and unique finding that for those already prepared, adopting and maintaining their level of preparedness was hindered by perceived barriers of climate conditions and other priorities (Chapter 11, Table 39). Unlike the traditionally reported limitations of cost and time (e.g., Lindell & Whitney, 2000; Motoyoshi et al., 2004), these perceived barriers are purely based on cognitive interpretations. These perceived barriers and limitations are thus presented in the conceptual Model (Figure 11), demonstrating why some residents decide not to prepare. The additional unique finding of residents' sense of preparing being 'too hard' due to the barriers imposed by agencies and thus the resultant sense of disempowerment, was introduced in section 12.2, and will re-visited in section 13.3.

As discussed in Chapter Eight and Chapter Eleven, these perceived barriers and the unique occurrence of 'preparedness fatigue' experienced by the very prepared, could be combated by fire agencies promoting the additional benefits or 'dual purposes' of preparedness adoptions, thus promoting more frequent positive

reinforcement of such adjustments. As was introduced in section 11.2, the difficulty of residents' sustaining a high level of preparedness for infrequently occurring hazard events arguably calls for reframing hazard preparedness in an all-hazards, self-sustainable communities approach. This will be further explored in section 13.4.2.

While individual sense of responsibility was found to influence whether residents formed intentions to prepare for bushfires (see Model, Figure 6), the perceived barriers and limitations discussed above were commonly cited as the reasons for why these residents' intentions did not manifest in preparedness adoption. In support of this study's supposition of residents' social environment playing a fundamental role in the interpretation of bushfire risk and preparedness decision making, and providing a novel contribution to hazard preparedness literature, was the finding that a sense of social responsibility, or residents' feeling of responsibility for the welfare of others, influenced actual adoption of bushfire preparedness measures (Chapter 8, Table 19). In other words, many prepared residents explained that not only was their own personal safety, but the safety of other community members, an important motivating factor in actually adopting bushfire preparedness measures. Therefore representing an important influencing factor of residents' social environment, social responsibility is included in the conceptual Social Attachment Model of Bushfire Preparedness presented in Figure 11.

Although the influence of responsibility to others as a driving force behind the adoption of bushfire protective measures needs further investigation, it does suggest that tapping into people's pre-existing altruistic tendencies (Batson, 1992, 2010; Fischer et al., 2011) could help to improve the adoption of protective measures

for bushfire. For example, bushfire preparedness strategies could highlight how preparing can also help and reduce the risk for others living in the community, especially vulnerable populations such as children, the elderly, and the disabled.

The finding that a sense of social responsibility motivates adoption of bushfire mitigation behaviour highlights the need for community bushfire education programs to focus on highlighting to residents, not only their own responsibility for preparing, but how their preparing will help to protect others in their community. How this is portrayed however, is very important.

13.1.3 The community/agency interface: Mistrust and disengagement

Fire agencies merely telling residents that they are responsible for their own preparedness may result in residents perceiving the agency to be passing responsibility or blame. This can result in residents feeling mistrust (see Figure 11) towards the agency, and just as importantly, the information they provide, consequently resulting in their not attending to subsequent preparedness information. It is therefore imperative to explain to residents why it is their responsibility (e.g., highlight that most volunteer fire brigades only have one fire truck, warnings may not be issued in time, or at all, bushfire may behave in an unpredicted manner, and to help protect others in community) to prepare themselves the best they can, and fundamentally, how to do this. As such, a message that could easily result in residents disengaging from fire agency efforts, can act as an empowering experience (e.g., by providing specific information on how to effectively mitigate risk) promoting the adoption of preparedness measures (as supported by the Model, Chapter 6, Figure 6).

This new conceptual Social Attachment Model of Bushfire Preparedness (Figure 11) thus demonstrates how factors implemented in the community/agency interface can act to promote the adoption of bushfire preparedness measures (trust and empowerment), but importantly, just as easily reduce the likelihood that such measures are adopted (mistrust and disempowerment). The results of the present study have demonstrated how the relationship between the community and the fire agencies, and the way the fire service personnel engage with their communities, is fundamental to promoting and sustaining community bushfire preparedness. As was demonstrated by the Pilot (Chapter 9), a realistic and effective way of developing a partnership between community and fire agencies built on empowerment and trust, which facilitates community preparedness, is by adopting a community engagement approach.

Community bushfire preparedness initiatives that foster resident and social responsibility for preparedness, delivered in an empowering setting provided by fire agencies, will foster trust in the fire agency, promote the communities' sense of empowerment, and increase the likelihood that bushfire preparedness information and measures are heeded, adopted, and maintained. The success of such an approach, as illustrated by the Pilot (discussed in Chapter 9) and discussed in Chapter Twelve, relies however on agencies allowing residents to take responsibility for their own preparedness and not inadvertently disempowering them (Figure 11). The community/agency interface thus presents a critical phase in residents' decision making process as the nature of the relationship between their community and fire agencies will dictate whether residents successfully obtain the information and support they require to adequately prepare for bushfires. This will be further discussed in section 13.3.

This conceptual Social Attachment Model of Bushfire Preparedness (Figure 11) thus provides a framework from which fire agencies (and arguably other hazard agencies) can develop and implement more effective bushfire risk communication and preparedness education policies and initiatives. Evidence of the utility of this conceptual Model was provided in the action research component of the present study (see Chapter 9). A discussion and summary of how this Model's application to a practical community engagement program, thus providing a novel contribution to hazards literature by bridging the common theory-practice divide, is provided in the following section.

13.2 Bridging the Theory – Practice Divide: The TFS Community Bushfire Preparedness Pilot

A considerable proportion of the research on community bushfire mitigation has been based on qualitative case studies focused on the United States and eastern seaboard of Australia (McFarlane et al., 2011). These studies have been valuable in developing an understanding of householder and community bushfire mitigation problems but are limited in their generalisability to larger populations or diverse social, cultural, and management contexts. The emerging recent trend of testing empirical models grounded in theory has been a significant contribution to the hazard preparedness field.

The present study contributes to this literature by extending the understanding of community bushfire preparedness by developing and testing a model with foundations in well-established theories from hazards research and incorporates concepts that are unique to bushfires (e.g., people choose to live in the environment that poses the bushfire risk). Unlike previous empirical models of bushfire preparedness, this study draws attention to the seemingly fundamental role

of place attachment in the pre-contemplative stage of homeowners' bushfire mitigation decision making process.

Potentially the most important contribution of the present research to the hazard preparedness literature is the application of the above described theory-driven Social Attachment Model of Bushfire Preparedness (Chapter 6, Figure 6) to a practical community bushfire preparedness initiative. The collaboration of the researcher with the Tasmania Fire Service Community Development Officer provided a unique opportunity to apply the principles of the Model to develop and implement the Bushfire Ready Communities Tasmania Pilot (Pilot). The resulting action research, presented in Chapter Nine, thus bridges the theory-practice divide that appears to plague hazard preparedness research. Although previous, albeit few, studies have developed and tested empirical models of bushfire preparedness (e.g., Martin et al., 2009; McFarlane et al., 2011; Paton et al., 2010), and important implications for hazards communication and education have resulted, their outcomes still only constitute recommendations. The present study has provided evidence for the efficacy of the Model to successfully inform the development and implementation of an effective community bushfire preparedness initiative.

The Pilot, reflecting the Model's (Chapter 6, Figure 6) findings that social and community processes (e.g., psychological sense of community and community involvement) play a fundamental role in individuals' decision making processes, adopted a community engagement approach to develop and implement more effective bushfire preparedness education initiatives. By consulting, engaging, and participating with residents in four target communities, the Tasmania Fire Service Community Development Officer (and researcher) obtained a rich understanding of the communities' personalities, values, capacities, resources, barriers and priorities,

thus ensuring that initiatives that were developed would specifically meet the needs of that community and therefore be more effective. Importantly, this intimate relationship with the communities provide the Community Development Officer with an insight to the residents' attachment to place and could thus tailor bushfire mitigation information accordingly, consequently ensuring greater attention, retention, and sustainment of the important advice.

To promote bushfire preparedness becoming a community initiative and norm, thus ensuring its maintenance over time and the communities' resilience to future hazards, initiative templates were developed and tested to provide communities with tools for future community bushfire engagement. These templates included Forums, Field Days, Bushfire Ready Neighbourhood groups, and the Bushfire Survival Plan.

A further significant outcome of the Pilot was the establishment and formal recognition of a Community Engagement Officer role within the local fire brigades. This conception represents a very positive step in shifting the fire agency's operational focus to one that acknowledges the worth of promoting community preparedness, and a cultural shift from information dissemination to community engagement. Furthermore, reflecting the fundamental appreciation that every community is different (as highlighted in Chapter 7), and sub-communities within these communities are unique and have different needs, the Pilot adapted to and addressed the important study finding that women were significantly less prepared for bushfire than men.

The Women's Bushfire Workshop highlights the necessity and ability of community engagement initiatives to adapt to unique issues within communities.

The finding that women were less prepared than men, more likely to leave early, but were relatively unprepared to do so, suggested that current bushfire preparedness communication and education formats do not effectively target women. Based on the South Australian fire service's 'Firey Women' (South Australian Country Fire Service, 2011) workshop template, a Women's Bushfire Workshop was trialled in a fifth community, and although successful (i.e., well received, positive outcomes; see section 10.2, Figure 10), was very poorly attended (due to it clashing with a Thai community cooking workshop). This suggests that in order to foster community bushfire preparedness, an existing sense of community must exist on which to build these capacities. This was supported by the Model (Chapter 6, Figure 6) which highlighted the important mediating role of social processes (e.g., psychological sense of community and community involvement) in the relationship between individual factors (e.g., place attachment and negative outcome expectancy) and actual bushfire preparedness.

The benefits accruing from the Pilot program outlined in Chapter Nine, which range from more cost-effective program templates of agency resources to increasing the likelihood of sustained bushfire preparedness, provide a cogent argument for continuing and expanding bushfire risk communication programs based on community engagement and empowerment principles.

However, the success of such programs and approach rely on fire agencies acknowledging the worth of promoting community bushfire preparedness and shifting their culture of information dissemination to one that promotes community engagement. The current traditional approach, as outlined in Chapter Twelve, at best has no influence on communities' bushfire preparedness (since current education approaches only increase awareness and not preparedness) and at worst fosters

feelings of mistrust and disempowerment between fire agencies and the communities they serve. What is more, this culture of disempowering community members from becoming responsible for their own safety seems to be a reflection of society as a whole. As such, is it surprising that people do not prepare themselves for natural hazards?

13.3 "Cotton-wool Culture" Disempowering Communities

There is a sense that in the government's efforts to protect the community and avoid litigation, society has become even more vulnerable to Nature's fury. Like an overprotective parent sheltering its children from every danger, society has become so vulnerable to every hazard because its people have not had the opportunity to grow and learn from earlier hazards removed from them. As a result, society has become accustomed to hiding behind the skirts of its mother and blames her when the inevitable disaster renders her useless. As resilience literature explains (de Terte et al., 2009; Paton, 2006; Pritchard & Gow, 2008), unless people are faced with challenges, they are not provided with the chance to overcome them, and thus learn and build on capacities to cope with future challenges. Ironically, in an attempt to protect society, the state has disempowered its people. There seems to be two important consequences of this:

- Responsibility for ensuring communities are prepared for bushfire is perceived to lie with the authorities
- Becoming prepared for bushfires has become too complex

Due to this cultural shift of relying on the government for public safety (e.g., crime/policy, social security, fire brigade etc.) agencies such as the fire service find themselves in the impossible position of being expected to defend every property and

person in the event of a fire or bushfire (e.g., EMRS, 2010). The following extracts (Table 40) from interviews with residents portray this view of 'someone else's responsibility':

Table 40

Resident Perceptions of 'Someone Else's Responsibility'

...they couldn't provide any positive you know feedback for people who are living here, yet they were saying these are the dangers, like one guys who's done the research, said these are the dangers and then the council couldn't take responsibility and neither could any other service there take [agency representatives at Community Forum] responsibility, and neither can we cause I can't take responsibility myself for other you know trees that are not on my property that borders a road and...I think if you look at it legally, the road that's built is a very narrow road, and the council are responsible for so much width beyond the road that is actually there, you know, so they're responsible for a certain amount of width either side of the road, you know so, yeah, and obviously they don't want to take responsibility... (Phoebe from Snug, interview 2)
(*Whose responsibility do you think it is to ensure that people in the community are prepared for bushfires?*) Oh well, I suppose er number one the fire authorities, and councils need to be involved in it too of course but err, yeah, first of all the fire authorities (*what sort of things should they do?*) oh well, education I think has gotta be pushed at them all the, at the community all the time, people need to be aware of the dangers and things... (Denis and Mary from Snug, interview 1)
...I guess, that's not just in terms of fire things [people feeling entitled to stuff], to my mind in relation to everything and everyone says 'oh, why doesn't the government do this, why doesn't the government do that?', well I'm a socialist and I believe in the government having a role to plan and things but um, I do think that there's sometimes a lack of um taking, everyone says 'we're entitled to that' by no one says 'what's my responsibility?', that's the fundamental...(Kevin from Kettering, interview 2)

Although the fire service realise and attempt to educate the public that it is impossible for them to defend every property in the event of a major bushfire, millions of dollars are still spent, and media coverage is still focussed, on the purchase of new fire appliances. For example, the Tasmania Fire Service could

quadruple its 2011-2015 community education and awareness budget ($150,000) by reducing its 2011-2015 fire fighting appliance replacement budget (more than $6.5 million) by one per cent. Even if the 'community fire protection planning program' (which arguably will only have a minor effect on residents' preparedness) budget is taken into account, only 5.48 per cent of the entire Tasmania Fire Service budget over the next four years has been dedicated to improving communities bushfire preparedness; the **only** thing guaranteed to reduce the negative consequences of bushfires.

The policy shift implored after the devastating 2009 Victorian bushfires (VBRC, 2010) to a focus of 'shared responsibility' between communities, agencies, and government, is the result of the understanding of this unsustainable culture of agencies being seen as responsible for people's safety. However, the cultural shift will inevitably be slow, and the damage done will continue to be felt in the short term and will thus require to be addressed by relevant community development officers into the future.

A fundamental issue emanating from this culture of reliance is the sense that becoming prepared for bushfires is too hard. Participating residents of this study explained how there were just too many hoops to jump through to prepare themselves for bushfires. This highlights the importance of considering not only residents' social environment in appreciating how bushfire preparedness information is interpreted, but also the fundamental role of a societal level influence on this process. As such, this community/agency interface (as portrayed in the conceptual Model, Figure 11), can result in residents deciding not to prepare through the manifestations of 'too hard' mentalities, mistrust, and disempowerment (depicted in Figure 11; more detail provided in Chapter 12).

As discussed in section 12.2, Sarah from Fern Tree found that burning off cleared vegetation required the tedious and prolonged process of obtaining a permit and permission from both the council and volunteer fire brigade, during which time the weather could have changed and window of opportunity to burn off lost. James from Binalong Bay similarly explained that becoming prepared for bushfire was implicitly not supported by the council in their act of applying a fee to access the green waste disposal depot. Clint from Bagdad provides a further example and expressed his deep concern for authorities hindering his fire fighting efforts in the event of a bushfire due to litigation issues and the need for local fire authorities to allow individual property owners to look after themselves:

> ...This is where it all comes back to, having some sort of a, I understand there would be a...paper nightmare so to speak, some sort of an idea that who's got the potential to save what, who's got the potential to survive a catastrophic or whatever so that when you do like the situation where...I go down the road and get another load of water from my water station, and the police have said you can't go back in, you know, I'm going to lose everything aren't I? And where the fire brigade can say 'no, he's got the ability to do what he needs to do, just let him go', what could end up being a potential argument with a policeman, could be all avoided...there are issues there, it's a ticking time bomb...

As such, in order to give community engagement initiatives a chance to increase community bushfire preparedness, community members need to be allowed to take responsibility for their own safety. This will require a cultural shift in society as a whole, but more immediately (and more attainably) within the fire agencies themselves.

13.4 Implications and Recommendations

13.4.1 Agency transition to community engagement

While the focus on community engagement tends to be on the community, it is clear from application of empowerment theory and the findings of the present study that engagement is a two way process. Therefore, to ensure the development and implementation of effective community engagement programs to foster sustained levels of community bushfire preparedness, it is necessary to develop a partnership between communities and agencies that is built on empowerment and trust. While this study offers novel insights into community development processes and identifies societal/agency issues which hinder these, additional research is required to understand the training, organisational, and cultural-change needs required of agencies. The following discussion and recommendations suggest avenues for future studies.

The present study offers a conceptual Social Attachment Model of Bushfire Preparedness whose effective and successful practical application was demonstrated by the Tasmania Fire Service Community Bushfire Preparedness Pilot (Chapter 9). However, for the benefits of such a community engagement approach to be realised, fire agencies need to acknowledge the worth of community bushfire preparedness and the efficacy of adopting a community engagement approach. Even though a key role of the fire agency and its volunteers is to engage with and support community initiatives to become better prepared for bushfire (AFAC, 2010), the often dysfunctional relationships that exist between the fire agency and communities presents a real barrier to this realisation (see section 12.1).

One of the main reasons for this unfortunate occurrence appears to be the slow (even stalled) culture transition from the 'top down', authoritarian, information dissemination model traditionally held by fire agencies. As this stagnation appears to be most evident at the volunteer fire brigade level, it suggests that this 'new' message of 'shared responsibility' (AFAC, 2010; VBRC, 2010) and community empowerment (AFAC, 2010) is only slowly trickling down to the important front line (i.e., volunteer brigades). This culture shift is further hampered by the apparent negligible support proffered by fire agency budgets (e.g., Tasmania Fire Service allocating less than 6% of its four year budget to community education initiatives).

This has practical implications for agency-level change. To avoid the discordant and inappropriate, from an empowerment perspective, communication evident in this context between levels of the fire agencies, a 'two pronged' approach to community preparedness and engagement promotion is recommended. By allocating more funds and establishing a dedicated Community Engagement unit, fire agency management will be providing an example to the subsequent levels of the agency that community engagement is taken seriously and is the future direction of the fire agency. In other words, act on a position already adopted (AFAC, 2010).

As demonstrated in section 3.3, other Australian fire agencies have made significant headway in adopting community engagement as part of their operational ethos by funding dedicated Community Engagement units. To ensure community engagement is adopted across all levels of the fire agency, dedicated Community Engagement Officers (a significant result of the Pilot) should be appointed in all volunteer fire brigades. These volunteers, supported by the dedicated Community Engagement units and their paid facilitators, could thus provide training and support to other brigade members (e.g., effective communication workshops, designing

community specific preparedness programs) to foster agency/community partnerships built on trust and empowerment.

Evidence that the community would support and benefit from such appointments is provided by the fact that during the time the Pilot was engaged with the four (five, including Middleton) target communities, numerous neighbouring communities contacted the Community Engagement Officer, asking her to include their community in the Pilot (as discussed in section 10.2.5.1). The appointment of a Community Engagement Officer within the Fern Tree Fire Brigade (formally recognising a role already adopted by a very community minded volunteer fire fighter), the development of the Bushfire Survival Plan, and establishment of 15 Bushfire Ready Neighbourhood groups provides further evidence of the positive effect this 'two pronged' community engagement approach can have in promoting communities' bushfire preparedness (discussed in section 9.2.5).

Although the above recommendation is made in recognition of the fact that considerable advancement can be made in improving the often dysfunctional relationship between agencies and the community, and the assumed role of supporting, encouraging, and assisting (i.e., community engagement) communities to become better prepared for bushfires taken more seriously (i.e., increase community awareness and education budget), the disinclination on the part of residents actually adopting recommended measures also needs to be addressed.

13.4.2 All-hazard approach to preparing

As discussed in section 10.2, even residents who had adopted recommended bushfire preparedness measures and voiced their intentions to prepare more, were found in follow-up interviews a year later not to have adopted these measures. This lack of motivation was attributed to the weather/climate not being indicative of a 'bad' bushfire season, or other priorities getting in the way (Table 39). Even though these residents acknowledged the unpredictable nature of bushfires and thus the need to be prepared year round, these seemingly trivial barriers (i.e., not due to lack of finances or physical inability) appeared to be enough to hinder their increased and sustained preparedness.

The unique finding of prepared residents experiencing 'preparedness fatigue' (section 8.3) suggests that lack of positive reinforcement of adopting bushfire preparedness measures is resulting in residents losing motivation to sustain mitigation activities. As was suggested in sections 8.3.1 and 11.2, highlighting the extra benefits or 'dual benefits' of adopting certain measures (e.g., installing sprinkler system can double as garden watering system; installing Gutterguard can increase value of house) will boost residents' motivation to adopt such measures and maintain them as the benefits of such 'costs' will be realised sooner, thus providing earlier positive reinforcement.

Furthermore, by reinforcing the benefits of certain measures mitigating other hazards such as flooding or storm surges (e.g., preparing 'leave early kit' valuable in other emergency situations; removing overhanging trees to protect against storm damage; reduce ground fuel to reduce snake risk), especially those with which residents more frequently interact, measures recommended for bushfires will be seen to have extra advantages; potentially resulting in the benefits more likely being seen

to outweigh the costs. Such an all-hazards approach to communicating the benefits of adopting mitigation strategies may also address the issue of residents' place attachments hindering the adoption of mitigation strategies that modify the natural environment. For example, by reframing the advantages of removing trees that overhang a resident's house to not only reduce bushfire risk but also protect against potential property damage during storms, residents may be more inclined to acknowledge the benefits of modifying the environment they value so highly.

As well as adding extra weight to the benefit side of the cost/benefit argument, adopting an all-hazards approach to preparedness adoption may counter the lack of planning that was common amongst those (especially women) residents who decided they would 'leave early' in the event of a bushfire. If all residents were encouraged to formulate a detailed 'leave early' plan, including (amongst many other things) making copies of important documents, having an inventory of valuable possessions to bring, having a 'survival kit' including bottled water, imperishable food, battery operated radio and torch, and knowing where to go, because of its all-hazard applicability (e.g., tsunamis, floods, storms, terrorist attacks), people might be more willing to comply as they would see the many benefits accruing from a relatively small cost. The fact that climate change will result in more extreme weather, and consequently natural hazard events, further reinforces the benefit of adopting an all-hazards approach to community preparation.

Perhaps as Mileti (1999) suggested, a new approach to hazards needs to be adopted. He suggested that by acknowledging that disasters result from the interaction of the human system and the earth's physical system, and are not surprise environmental events, society needs to take responsibility for disasters. He implored that people understand that it is in fact humans, and the decisions they make, that

result in disaster, and that nothing can be done to stop natural hazards occurring, as no conceivable technology can quell the force of nature permanently. As such, Mileti urged the embracing and anticipation of ambiguity and change, of viewing hazards as unpredictable and non-linear, and thus requiring human adaptation to become as dynamic as the hazards themselves, rather than expecting recommended mitigations to be enough to reduce future loses.

This 'new approach' suggests rejecting short-term thinking for long-term sustainable mitigation efforts; overcoming cultural and economic predispositions to thinking primarily in the short-term, and making decisions that will last well into the future. This will ensure preparedness becomes an attitude that will survive the generations and as such, mitigation must become a basic social value:

> Sustainability means that a locality can tolerate and overcome damage, diminished productivity, and reduced quality of life from an extreme event without significant outside assistance. To achieve sustainability, communities must take responsibility for choosing where and how development proceeds. Toward that end, each locality evaluates its environmental resources and hazards, chooses future losses that it is willing to bear, and ensures that development and other community actions and policies adhere to those goals (Mileti, 1999, p. 7).

Furthermore, Mileti (1999) reasons that more model communities of sustainable hazard mitigation, such as was provided in examples like Fern Tree, would facilitate a shift in emergency management to community responsibility and capability. He argues that if more programs to assist communities move toward disaster sustainability and resiliency are essential and that "involved communities should be extensively researched to determine the factors that influenced their success and failures" (p. 282). The research presented in this thesis responded to this call.

The results of this study clearly demonstrate that collaborative approaches to bushfire mitigation can be implemented in numerous communities, in a variety of different ways. The findings also demonstrate that this community level bushfire mitigation, and the residents involved in it, are not only reducing bushfire risk in their communities, but also building community resilience, and developing a partnership with fire agencies built on mutual trust and respect. Thus there are clear benefits not only for communities and their residents, but also for fire agencies, to participate, design, and support community engagement bushfire preparedness programs.

13.5 Limitations of the Present Study and Directions for Future Research

In concluding this chapter, the following section reports on the potential limitations of the present study and how these may be addressed by future research.

Residents who participated for the qualitative component of the study, the telephone interviews, were recruited from bushfire education forums/information nights, which therefore may represent a sample bias in that those recruited were already aware of and engaged in community bushfire preparedness initiatives. Although there was still variance in these data (i.e., a number of participants indicated not being very prepared), these residents may already have felt that bushfire preparedness was their responsibility and were attending the information session to obtain more detailed information on how to mitigate bushfire consequences. Future research should attempt to recruit participants, especially for qualitative components, that are disengaged from community bushfire preparedness information so to obtain more data on why many residents are not and do not want to prepare for bushfires. Recruitment at local grocery stores or post offices rather than

community groups would also ensure that the sample was not biased by social variables such as community involvement

Furthermore, the four areas targeted for the present research represented mainly semi-rural areas. These areas were selected for their ability to articulate key research issues such as high bushfire risk, sense of community, previous experience/community narratives, and relationship with local volunteer fire brigades. Future research should thus seek to include more urban areas to determine how such community profiles may differ in regards to bushfire preparedness.

The present study was interested in promoting bushfire preparedness of property owners in Tasmanian communities. Although a conscious effort was made to try and recruit a more transient population including the holiday homeowner or 'shackie', due to limitations in the ability to provide this sample with a questionnaire (many holiday homes/shacks do not have letter boxes), part time residents or 'visitors' made up less than 10 per cent of the sample (9.09%; Chapter 5, Table 8). Acknowledging the fact that bushfires more commonly occur during the summer months, which coincide with the main holiday period, and considering Tasmania's popularity as a tourist destination, targeting the transient population (e.g., holiday makers, tourists, shack owners) and determining how their bushfire safety can be promoted becomes an import future research direction.

The finding by the present research that women were significantly less prepared than men for bushfire, were more likely to decide to leave early, but less likely to adequately prepare to do so, and considerably less likely to attend and engage with current forms of bushfire education, highlights the dire need to focus research on this sample of the population. Although other research has recognised

this need and programs tailored to specifically target women, as the present research found in its own attempt to engage women in a specifically tailored initiative (Chapter 10, Women's Bushfire Workshop), engaging this group, especially the elusive young mothers sub-group, seems to present a particular challenge. However, as the findings of the present study suggest, an effective way of engaging this group may be through their children (sections 8.3 and 10.2). Therefore, future research should dedicate more time exploring why women remain significantly less prepared than men, why they perceive leaving early as being the best option but do not actually prepare to effectively do so. Future community engagement initiatives could target families and specifically children in an attempt to also reach their parents, especially mothers.

The finding that residents who had decided to leave early were significantly less prepared than those who had decided to stay and defend, suggests current education formats do not effectively portray the importance of preparing to leave early. It may be that residents feel 'leaving early' is synonymous with fleeing, an action that is not normally associated with preparing. There is also a sense that 'stay and defending' is an Australian cultural norm and that protecting your home is the 'proper thing to do' and leaving early is 'the easy way out'. Whether this is a norm and whether it has any bearing on residents not taking the time to plan and prepare for 'leaving early' presents an import future research direction.

Bushfire preparedness and intention to prepare were measured in this study by rating each mitigation activity against fire agency recommendations. Respondents were asked to list the behaviours/actions they had adopted in an attempt to reduce response bias. Importantly, this method also allowed residents who had decided to leave early and made preparations to do so, to rate highly or well prepared on this

bushfire preparedness measure. This approach and method is recommended to be adopted by other hazards researchers so to validate the arguably more accurate assessment of people's level of preparedness. Validation of this approach and its implementation in hazards research, would allow more poignant assumptions and conclusions to be made.

Personal responsibility and responsibility to others were found to be important influencers of adopting preparedness measures. Whilst the Social Attachment Model of Bushfire Preparedness demonstrated the role of personal responsibility in mediating the relationship between community variables and intention to prepare, the qualitative data suggested that responsibility for other people's safety influenced residents actually adopting preparedness measures. The roles of these variables need to be explored in future research and more substantive measures used to test them. A limitation of the present study was that the measure used to test 'personal responsibility' only included two items. The importance of this variable however, was validated by the qualitative data.

Place attachment, or more specifically 'place identity' was found to be a significant factor providing precursory motivation to people's bushfire preparedness decision making process. The measure of place attachment, mostly used in natural resource management literature, included the two dimensions of place dependence and place identity. As place dependence 'taps into' residents' feelings of whether a certain place or environment meets their recreational or lifestyle needs, it was not very appropriate for the study (e.g., item 18d – 'I get more satisfaction out of visiting this area than any other'). In fact, several comments were made by questionnaire respondents on these place dependence items (e.g., Do you mean the suburb I live in? Do not know to what I am answering. What area? Qu. 18 d-j – ambiguous Qu.

18g-h – the above questions need work!). Future research on bushfire preparedness should explore the seemingly fundamental role of this construct but also develop a measure more appropriate for hazards research.

A further limitation of the present research was the large component of cross sectional data. The questionnaire only collected data at one time point. This meant that participants were answering questions reflecting various stages of their reasoning process in regards to preparing. Participants may have been at the beginning, middle, or end of their reasoning process and as such, the questionnaire data may have been assessing place attachment judgements in some participants while others may have moved on to obtaining community support and advice for adopting preparedness measures. Whilst a qualitative longitudinal component was included in the study to compensate for this limitation, and provided some valuable information in regards to the progress of residents' preparedness intentions, it did not span a sufficient time period to determine if and how barriers (e.g., climate conditions, other priorities) were overcome, or how other social and agency influences, such as Pilot implemented initiatives, may have assisted this. Future interviews with these residents (over the next five years for example) could provide a much richer insight into the factors that influence individual and community bushfire preparedness.

Related to the cross sectional nature of the quantitative data was the relatively small return rate (18.76%) of questionnaires from the four target areas. Whilst the sample size was adequate to conduct structural equation modeling analysis and test the proposed model of bushfire preparedness, it precluded further rigorous testing and comparing of the Social Attachment Model of Bushfire Preparedness across the

four different communities. It also prevents the present research from generalising too much to a wider population.

Due to limited resources, the Pilot was only trialled in four target communities. Although these communities were selected to increase sample variance and thus generalisability, a larger test area would have provided more of a challenge to the application of the Model and study findings. Furthermore, the Tasmania Fire Service Community Development Officer felt disappointed to have to tell neighbouring community representatives that she was unable to extend her trial and support to their areas due to limited resources. Although one of the main recommendations of the present research is for community engagement initiatives, fostering a relationship of trust and empowerment between communities and their local fire brigades, to be implemented in all bushfire prone communities, it also argues for hazards research to, where possible, include an applied component to their studies so to validate and trial their developed theories.

One of the key discussion points emanating from the present study was that for the success of the proposed community engagement approach based on the Model findings to be realised, a more harmonious relationship between fire agencies and communities needs to be fostered. The thesis provided examples of dysfunctional relationships (that reflect a lack of knowledge/culture on creating empowering settings), which is evidence of how cultural stagnation, responsibility confusion, disempowerment, and poor communication, obstructed the promotion of community driven bushfire preparedness. However, these data were largely gathered from the community participants and thus represented to a great extent the communities' perspective. Although the volunteer fire brigades and fire agencies perspective were represented (e.g., section 9.2.4 – volunteer fire brigade/community

belief disparity), future research into the culture change and training required to shift agencies to adopt a community engagement ethos, need to include a much larger component of data collected from fire agency members and representatives. This would provide a much more balanced view to this important future direction of bushfire research.

Chapter Fourteen – Concluding Remarks

The findings of the present study have provided a considerable contribution to the natural hazards literature. While studies exist that have demonstrated through modeling techniques the important influence of cognitive, social, and societal processes on individuals' bushfire preparedness decision making, none have validated the efficacy of such models by demonstrating their practical applicability. The present study, through a mixed-methods action research approach, thus offers a way of bridged this theory-practice divide.

While bushfires are a complex, unpredictable, and life-threatening phenomena, the fact that people choose to live in environments that increase their susceptibility to its effects, renders studying how bushfire risk and mitigation information is interpreted by residents fundamentally important. As demonstrated by the study's findings, the influence of people's social environments and societal relationships is pivotal to this interpretation and decision making process. The influential antecedent nature of place attachment, as well as the roles of individual sense of responsibility and social responsibility, were presented in the new conceptual Social Attachment Model of Bushfire Preparedness (Figure 11), and demonstrate the critical nature of the individual/community interface in influencing residents' decisions to prepare for bushfires. This new Model, developed by combining the unique yet congruent findings of the qualitative and quantitative components of the present research, further demonstrates the critical ability of the community/agency interface (Figure 11) to either facilitate or prevent residents actually adopting bushfire preparedness measures.

As was demonstrated in Chapter Twelve, the current approach of fire agencies to promote individual bushfire preparedness (top-down, information

dissemination) has a tendency to foster mistrust in and disengagement from the agencies themselves, and the information they provide. The new conceptual Social Attachment Model of Bushfire Preparedness demonstrates that in order for communities to become bushfire prepared ,and sustain this into the future when it counts, a partnership between communities and fire agencies built on trust and empowerment must be developed. How such a partnership can be facilitated through the principles of community engagement was demonstrated by the action research component of the present study (Chapter 9 - Pilot).

The Tasmania Fire Service Bushfire Ready Communities Tasmania Pilot (Pilot) demonstrates how through the collaboration of social researchers and agencies, more effective and evidence-based initiatives can be developed. The application of the findings from the present research, to inform the development and implementation of the Pilot, provides practical evidence of the utility of the Social Attachment Model of Bushfire Preparedness and the efficacy of adopting a community engagement approach based on empowerment principles to facilitate the promotion of more prepared and resilient communities.

In order for these Pilot outcomes be generalised and fully realised, the culture of fire agencies must change from a curative to a preventative model. As it is recognised that such fundamental culture change cannot be achieved in years, generations, or even multiple generations, and in appreciation of the fact that bushfires will continue to pose a risk for susceptible communities, another approach must be adopted. The present study therefore recommends that at the very least fire agencies must acknowledge the futility of merely disseminating information to their communities, and recognise that a different approach to risk communication and bushfire preparedness education is needed.

The findings presented in this thesis offer a more cost effective and practically feasible method of promoting and sustaining community bushfire preparedness. However, in order for the positive outcomes of this approach to be realised, it requires fire agencies to have an open mind, and ideally, more open wallet.

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Appendices

A. Bushfire Preparedness Questionnaire (inc. information sheet and consent form).....403

Refer to included compact disc (CD) for Appendices B to R

B. Telephone interview information sheet
C. Telephone interview consent form
D. Telephone Interview Schedule – Bushfire Season 2009/10
E. Telephone Interview Schedule – Bushfire Season 2010/11
F. Focus group information sheet
G. Focus group consent form
H. Focus group question schedule
I. Forum evaluation survey
J. Field Day feedback sheet
K. Post-meeting survey of volunteer fire brigade members
L. Women's Bushfire Workshop focus group information sheet
M. Women's Bushfire Workshop focus group consent form
N. Malahanobis distance test for multivariate outliers SPSS output
O. Structural equation modeling AMOS output
P. Analysis of variance of individual and community variables comparisons
Q. Transcripts of telephone interview 1 (2009/10; n =34)
R. Transcripts of telephone interview 2 (2010/11; n = 34)

Appendix A

Bushfire Preparedness Questionnaire (including information sheet and consent form)

Bushfire Preparedness Questionnaire

2009-2010

Involving the Tasmanian community in bushfire preparedness research

UTAS
FACULTY OF SCIENCE, ENGINEERING & TECHNOLOGY
School of Psychology

bushfire CRC
Bushfire Co-operative Research Centre

School of Psychology **January, 2010**

RESEARCH INFORMATION SHEET

Bushfire Preparedness: Identifying Influencing Factors through Action Research

You are invited to participate in a research study into what personal and community factors influence bushfire preparedness. This study is being conducted by Mai Frandsen to fulfil the requirements for a Doctorate in Psychology, and is being co-supervised by Professor Douglas Paton and Dr Krissy Wilson (University of Tasmania).

Objective of the Study

This research will assess factors that influence how and why people make decisions about preparing or not preparing for bushfires. Preparing is seen as an important factor in assisting communities to safeguard their wellbeing and minimise disruption (e.g., damage to property, loss of work) should a bushfire threaten them. The enclosed survey includes questions that have been identified, through extensive telephone interviews with residents living bushfire risk areas (August – December, 2009), as being able to help us understand how people make decisions about managing risk from bushfires.

The information produced by this research will be used to enhance the effectiveness of public information programs by tailoring the information content and how it is delivered to the public in ways that that will help ensure that public education programs can meet the needs of the community.

Why are you being invited to participate?

This research will be conducted over the coming bushfire season and continue during the following two seasons (2010/11, 2011/12).To collect this information, surveys are being distributed to a random sample of 2000 households around Hobart and St Helens. Your household is one of those that were randomly selected.

We would like to take this opportunity to invite you to participate in this survey. Your participation will help ensure that future public education programs for bushfires can be targeted to meet the needs of your community and increase opportunities for community participation in the development of these risk management programs. One-on-one telephone interviews (approximately 30 minutes) will also be conducted with those people who are interested in participating further.

This survey is not intended to inform the householder about how to prepare for the bushfire season. For information on preparing your property, please contact the Tasmania Fire Service on (free call) 1800 000 699 or visit their website at www.fire.tas.gov.au

What will happen to the information provided?

A report summarising the findings of this survey, and information on how the findings will be used, will be published on the University of Tasmania, School of Psychology (http://fcms.its.utas.edu.au/scieng/psychol/) web pages. The data will be stored for five years in a locked cabinet, and all raw data will be destroyed at the end of the five-year period.

Your participation in this study is entirely voluntary. You may elect to refuse to answer any question on the survey. As the survey does not ask identifying information, the researchers will not know your identity. As a result, there is no way in which your responses will be identifiable to you in any research output.

If you do elect to participate in the telephone interview stage and complete the attached consent form, immediately upon receipt of the surveys, the researcher will separate the survey and consent forms so as to retain the anonymity of your survey data.

With your permission, we would like to record the telephone interview. While we will need a name and contact details to conduct the interview, no personal or identifying information will be used in the transcript of your interview. This will ensure your anonymity.

The above project has received ethical approval from the Human Research Ethics Committee (Tasmania) Network. If you have concerns or complaints about the conduct of this study you should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. If you need to contact the Executive Officer, please quote *HREC project number* H10859.

Your return of this survey will be taken as indicative of your having read the information sheet and of your agreement to participate in the survey component of this study.

If you would like to participate in the interview stage, please complete the enclosed interview consent form (at end of survey) and return it with your survey in the reply-paid envelope provided.

We would be grateful if the oldest person in your household could complete the survey and return it within two weeks of receiving it.

Should you wish any additional information or require further clarification regarding this study, please feel free to contact Mai (Ph: 6226 7462; Email: Mai.Frandsen@utas.edu.au).

Thanking you in advance for your assistance in this project.

Mai Frandsen

1. Personal Information

a)	Location (e.g., Fern Tree):		
b)	Gender:	☐1 Male	☐2 Female
c)	Age:	☐1 < 25 ☐2 25 – 30 ☐3 31 - 40	☐4 41 – 50 ☐5 51 – 60 ☐6 >61
d)	Highest Level of Education Completed:	☐1 Year 10 ☐2 Year 11 ☐3 Year 12 ☐4 Trade Certificate ☐5 TAFE Course	☐6 Undergraduate Degree ☐7 Graduate Diploma ☐8 Masters Degree ☐9 PhD ☐10 Other (please specify):
e)	Relationship Status:	☐1 Single ☐2 Defacto/Married	☐3 Divorced ☐4 Separated ☐5 Widowed
f)	Do you have any children that live with you?	☐1 Yes ☐2 No	
g)	If YES, please indicate the age of the children:	☐1 0 - 2 ☐2 3 - 5 ☐3 6 - 10	☐4 11 - 15 ☐5 16 - 18 ☐6 >18
h)	Occupation (please specify):	_____	☐1 Retired ☐2 Unemployed
i)	Do you own/rent your house?	☐1 Own it ☐2 Rent it	☐3 Visitor
j)	Was your current residence pre-existing or did you build?	☐1 Bought ☐2 Built	☐3 Other:_____
k)	Residency Status:	☐1 Full time ☐2 Part time	☐3 Visitor
l)	How long have you lived in this area?	_____years	
m)	How long have you lived in this house?	_____years	

2. Bushfire Preparedness

a) Do you believe there is a bushfire risk in your area?	☐1 Yes ☐2 No	Please comment:
b) Have you made any <u>structural changes</u> to your <u>house</u> to make it more bushfire safe?	☐1 Yes ☐2 No	Please list: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____
c) Do you have any <u>fire fighting equipment</u>?	☐1 Yes ☐2 No	Please list: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____
d) Do you have any personal bushfire <u>protective clothing</u>?	☐1 Yes ☐2 No	Please list: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____
e) Do you intend to <u>leave early</u> in the event of a bushfire in your area?	☐1 Yes ☐2 Maybe ☐3 No	Please comment:
f) In the <u>next month</u>, do you intend to become more bushfire prepared?	☐1 Yes ☐2 Maybe ☐3 No	If YES, how so:
g) In the <u>next 12 months</u>, do you intend to become more bushfire prepared?	☐1 Yes ☐2 Maybe ☐3 No	If YES, how so:

			Please elaborate on answer:
h)	Are you prepared for a bushfire event in your area?	☐1 Yes ☐2 Don't know ☐3 No	
i)	Are your friends prepared for a bushfire?	☐1 Yes ☐2 Don't know ☐3 No	Please comment:
j)	Are your other family members prepared for a bushfire?	☐1 Yes ☐2 Don't know ☐3 No	Please comment:
k)	Have you attended any bushfire forums, information sessions, or brigade open days etc. in your local area?	☐1 Yes ☐2 No	If YES, please give details:

3. Previous Bushfire Experience

a)	Have you experienced a bushfire?	☐1 Yes ☐2 No	If YES, please give details (when, where, was there any damage?):
b)	Have any of your friends experienced bushfires?	☐1 Yes ☐2 Don't know ☐3 No	If YES, please give details:
c)	Have other members of your family experienced bushfires?	☐1 Yes ☐2 Don't know ☐3 No	If YES, please give details:
d)	Have other members of your community experienced bushfires?	☐1 Yes ☐2 Don't know ☐3 No	If YES, please give details:

4. Please rate your response to each of the below questions by circling the most appropriate number.

		Not at all informed						Very informed
a)	How well informed do you consider yourself to be about bushfire and bushfire risks?	1	2	3	4	5	6	7
		Not at all relevant						Very relevant
b)	To what extent do you find information about bushfires to be personally relevant?	1	2	3	4	5	6	7
		Not at all motivated						Very motivated
c)	How motivated are you to learn more about the connection between bushfire risks and undertaking behaviours to create defendable space?	1	2	3	4	5	6	7

5. Please rate your response to each of the below questions by circling the most appropriate number.

		Not at all concerned						Very concerned
a)	To what extent do you feel concerned about the effects of bushfire?	1	2	3	4	5	6	7
		Not at all serious						Extremely serious
b)	How serious do you feel the negative consequences of bushfires are to you personally?	1	2	3	4	5	6	7
		Not at all vulnerable						Extremely vulnerable
c)	How vulnerable do you feel about the possibility of a bushfire physically affecting you or your family?	1	2	3	4	5	6	7
		Not at all vulnerable						Extremely vulnerable
d)	How vulnerable do you feel about the possibility of bushfire affection your property and/or possessions?	1	2	3	4	5	6	7
		No harm at all						Extremely devastating
e)	How severe will the impact of a bushfire be where you live?	1	2	3	4	5	6	7

6. In regard to living in this <u>community</u>, please indicate (circle) the extent to which you agree or disagree with the following statements:

		Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
a)	Living in this community gives me a sense of community	1	2	3	4	5
b)	A feeling of fellowship runs deep between me and others in this community	1	2	3	4	5
c)	I feel loyal to the people in this community	1	2	3	4	5
d)	I like to think of myself as similar to the people who live in this community	1	2	3	4	5
e)	I regularly stop and talk with people in this community	1	2	3	4	5
f)	I agree with most people in this community about what is important in life	1	2	3	4	5
g)	If I needed advice about something I could go to someone in this community	1	2	3	4	5
h)	My friendships and associations with others in this community mean a lot	1	2	3	4	5
i)	I think of community planning in this community as a ‘‘we’’ not a ‘‘they’’ activity	1	2	3	4	5
j)	I believe my neighbours would help me in an emergency	1	2	3	4	5
k)	I would work together with others on something to improve this community	1	2	3	4	5
l)	Given the opportunity, I would like to move out of this community	1	2	3	4	5
m)	If I can I will remain a resident of this community for a number of years	1	2	3	4	5
n)	Overall, I am very attracted to living in this community	1	2	3	4	5
o)	I feel like I belong in this community	1	2	3	4	5
p)	I visit with my neighbours in their homes	1	2	3	4	5
q)	I rarely have neighbours over to my house to visit	1	2	3	4	5
r)	I borrow things and exchange favours with my neighbours	1	2	3	4	5

7. Which of the following activities are you currently involved with or have been involved with in the previous five (5) years?

Local sports club (e.g., cricket, football, bowls etc.)	☐ Please provide detail:
Local community committee (e.g., hall committee, community club, etc.)	☐ Please provide detail:
Local progress association	☐ Please provide detail:
Local craft group (e.g., sewing group, spinners and weavers etc.)	☐ Please provide detail:
Local children's group (e.g., mothers' group, kindergarten, crèche etc.)	☐ Please provide detail:
Church group	☐ Please provide detail:
Local environmental group (e.g., Landcare, Bushcare garden group, weeding party etc.)	☐ Please provide detail:
Local bushfire awareness group (e.g., Fireguard etc.)	☐ Please provide detail:
Local volunteer fire brigade	☐
State Emergency Service	☐
St John's Ambulance	☐
Other (please list):	

8. Please comment on how strongly you agree or disagree with the following statements:

		Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
a)	I have little control over the things that happen to me	1	2	3	4	5
b)	There is really no way I can solve some of the problems I have	1	2	3	4	5
c)	There is little I can do to change many of the important things in my life	1	2	3	4	5
d)	I often feel helpless in dealing with the problems of life	1	2	3	4	5
e)	Sometimes I feel that I'm being pushed around	1	2	3	4	5
f)	What happens to me in the future mostly depends on me	1	2	3	4	5
g)	I can do just about anything I really set my mind to	1	2	3	4	5

9. Please rate how accurately each of the following statements describes <u>you</u>:

		Very Inaccurate	Inaccurate	Neither Accurate or Inaccurate	Accurate	Very Accurate
a)	Can handle complex problems	1	2	3	4	5
b)	Let myself be directed by others	1	2	3	4	5
c)	Think quickly	1	2	3	4	5
d)	Let others determine my choices	1	2	3	4	5
e)	Formulate ideas clearly	1	2	3	4	5
f)	Am quick to understand things	1	2	3	4	5
g)	Do not have a good imagination	1	2	3	4	5
h)	Have excellent ideas	1	2	3	4	5
i)	Undertake few things on my own	1	2	3	4	5
j)	Never challenge things	1	2	3	4	5

10. Please rate how accurately each of the following statements describes <u>you</u>:

		Very Inaccurate	Inaccurate	Neither Accurate or Inaccurate	Accurate	Very Accurate
a)	Usually like to spend my free time with people	1	2	3	4	5
b)	Seem to derive less enjoyment from interacting with people than others do	1	2	3	4	5
c)	Talk to a lot of different people at gatherings	1	2	3	4	5
d)	Would not enjoy a job that involves a lot of social interaction	1	2	3	4	5
e)	Rarely enjoy being with people	1	2	3	4	5
f)	Love to chat	1	2	3	4	5
g)	Make friends easily	1	2	3	4	5
h)	Am hard to get to know	1	2	3	4	5
i)	Keep others at a distance	1	2	3	4	5
j)	Enjoy being part of a group	1	2	3	4	5

11. Please rate how accurately each of the following statements describes <u>you</u>

		Very Inaccurate	Inaccurate	Neither Accurate or Inaccurate	Accurate	Very Accurate
1.	Never give up hope	1	2	3	4	5
2.	Feel that my life lacks direction	1	2	3	4	5
3.	Know what I want	1	2	3	4	5
4.	Am not sure where my life is going	1	2	3	4	5
5.	Agree to anything	1	2	3	4	5
6.	Work on improving myself	1	2	3	4	5
7.	Am resigned to my fate	1	2	3	4	5
8.	Keep improving myself	1	2	3	4	5
9.	Love life	1	2	3	4	5
10.	Let others determine my choices	1	2	3	4	5

12. Please comment on how strongly you agree or disagree with the following statements:

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
a) Bushfires are too destructive to bother preparing for	1	2	3	4	5
b) A serious bushfire is unlikely to affect me in my lifetime	1	2	3	4	5
c) Preparing for bushfires will significantly reduce damage to my home should fire occur	1	2	3	4	5
d) Preparing for bushfires will improve my everyday living conditions	1	2	3	4	5
e) Preparing for bushfires will improve the value of my house/property	1	2	3	4	5
f) Preparing for bushfires will significantly improve my ability to deal with disruption to family/community life following a fire	1	2	3	4	5
g) Preparing for bushfires is inconvenient for me	1	2	3	4	5
h) I find it difficult to prepare for bushfires	1	2	3	4	5
i) I don't know how I can prepare for bushfires	1	2	3	4	5
j) Preparing for bushfires will help save lives should one occur	1	2	3	4	5

13. Please rate how accurately each of the following statements describes *you*:

	Very Inaccurate	Inaccurate	Neither Accurate or Inaccurate	Accurate	Very Accurate
a) Can handle complex problems	1	2	3	4	5
b) Wait for others to lead the way	1	2	3	4	5
c) Face problems directly	1	2	3	4	5
d) Am easily discouraged	1	2	3	4	5
e) Am good at many things	1	2	3	4	5
f) Am easily intimidated	1	2	3	4	5
g) Can't make up my mind	1	2	3	4	5
h) Complete tasks easily	1	2	3	4	5
i) Panic easily	1	2	3	4	5
j) Formulate ideas easily	1	2	3	4	5

14. In general, and with regard to what happens in your community, to what extent do you or do you not believe each of the following statements:

		Strongly Disagree	Disagree	Agree	Strongly Agree
a)	I generally accomplish what I set out to do	1	2	3	4
b)	I have a positive attitude about myself	1	2	3	4
c)	When I make plans, I am almost certain to make them work	1	2	3	4
d)	I am usually confident about the decisions I make	1	2	3	4
e)	I am often able to overcome barriers	1	2	3	4
f)	I feel I am a person of worth, at least on an equal basis with others	1	2	3	4
g)	I see myself as a capable person	1	2	3	4
h)	I am able to do things as well as most other people	1	2	3	4
i)	I feel I have a number of good qualities	1	2	3	4
j)	I feel powerless most of the time	1	2	3	4
k)	Making waves never gets you anywhere	1	2	3	4
l)	When I am unsure about something, I usually go along with the group	1	2	3	4
m)	Experts are in the best position to decide what people should do or learn	1	2	3	4
n)	Most of the misfortunes in my life were due to bad luck	1	2	3	4
o)	Usually, I feel alone	1	2	3	4
p)	People have a right to make their own decisions, even if they are bad ones	1	2	3	4
q)	People should try to live their lives the way they want to	1	2	3	4

	Strongly Disagree	Disagree	Agree	Strongly Agree
r) People working together can have an effect on their community	1	2	3	4
s) People have more power if they join together as a group	1	2	3	4
t) Working with others in my community can help to change things for the better	1	2	3	4
u) People are limited only by what they think possible	1	2	3	4
v) I can pretty much determine what will happen in my life	1	2	3	4
w) I am generally optimistic about the future	1	2	3	4
x) Very often a problem can be solved by taking action	1	2	3	4

15. Please indicate how frequently you have been involved in each of the following in the last three (3) months:

	Not at all	1 to 2 times	3 to 4 times	5 times or more
a) Signed a petition	1	2	3	4
b) Wrote a letter or made a telepone call to influence a policy or issue	1	2	3	4
c) Attended an event promoting information about community services	1	2	3	4
d) Arranged an agenda for a public meeting	1	2	3	4
e) Had an in-depth, face-to-face conversation about an issue affecting your community	1	2	3	4
f) Attended a public meeting to press for a policy change	1	2	3	4
g) Attended a meeting to gather information about a neighbourhood issue	1	2	3	4

16. Please comment on how strongly you agree or disagree with the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
a) Whether or not I get to be a leader depends mostly on my ability	1	2	3	4	5	6
b) Whether or not I get into a car accident depends mostly on how good a driver I am	1	2	3	4	5	6
c) When I make plans, I am almost certain to make them work	1	2	3	4	5	6
d) How many friends I have depends on how nice a person I am	1	2	3	4	5	6
e) I can pretty much determine what will happen in my life	1	2	3	4	5	6
f) I am usually able to protect my personal interests	1	2	3	4	5	6
g) When I get what I want, it's usually because I worked hard for it	1	2	3	4	5	6
h) My life is determined by my own actions	1	2	3	4	5	6

17. Please indicate the extent to which you agree or disagree with each of the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I feel responsible for preparing for major bushfires	1	2	3	4	5
b) It is the responsibility of Local, State and/or Federal agencies to prepare for bushfires	1	2	3	4	5
c) I <u>can't</u> be expected to prepare for bushfires	1	2	3	4	5
d) It is the responsibility of government agencies to <u>ensure</u> I am prepared for bushfires	1	2	3	4	5

18. Please indicate the extent to which you agree or disagree with each of the following statements:

		Strongly Disagree	Disagree	Neither Agree or Disagre	Agree	Strongly Agree
a)	I feel this area is a part of me	1	2	3	4	5
b)	Doing what I do here is more important to me than doing it in any other place	1	2	3	4	5
c)	This area is very special to me	1	2	3	4	5
d)	I get more satisfaction out of visiting this area than any other	1	2	3	4	5
e)	No other place can compare to this area	1	2	3	4	5
f)	I identify strongly with this area	1	2	3	4	5
g)	I am very attached to this area	1	2	3	4	5
h)	This area means a lot to me	1	2	3	4	5
i)	This area is the best place for what I like to do	1	2	3	4	5
j)	Visiting this area says a lot about who I am	1	2	3	4	5
k)	I wouldn't substitute any other area for doing the types of things I do in this area	1	2	3	4	5
l)	The things I do here I would enjoy doing just as much in a similar area	1	2	3	4	5

19. Please comment on how strongly you agree or disagree with the following statements: (Please note: bushfire agencies refers to the TFS including the volunteer brigades)

		Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
a)	I feel assured that the bushfire agencies do a good job developing policies to protect people	1	2	3	4	5
b)	I feel confident that the bushfire agencies and other government institutions take adequate steps to promote bushfire protection	1	2	3	4	5
c)	I feel sure that the bushfire agencies adequately protect me	1	2	3	4	5
d)	I feel sure that the bushfire agencies would act in my best interest	1	2	3	4	5
e)	It seems clear that the bushfire agencies are very concerned about my welfare	1	2	3	4	5
f)	I feel secure that the bushfire agencies are very knowledgeable about bushfire behaviour and their consequences	1	2	3	4	5
g)	If I was at risk of bushfires, I would definitely want to use information from the bushfire agencies	1	2	3	4	5
h)	When a bushfire issue or problem arises, I would feel comfortable depending on the information provided by the bushfire agencies	1	2	3	4	5
i)	I feel that I could count on the bushfire agencies to provide information about a crucial bushfire issue/incident	1	2	3	4	5

20. Please feel free to comment on anything else that you think is important in the research of bushfire preparedness:

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Date you completed this survey_____

(Please complete within 2 weeks of receipt and return in the reply-paid envelope provided)

Thank you for your participation

Telephone Interview Consent Form

1. I have read and understood the 'Information Sheet' for this study (see page 2 and 3).

2. The reasons for the study, what it will involve, and the possible effects of the study have been explained to me.

3. I understand that an interview will be conducted with me to obtain an understanding of my views on bushfire preparedness. It is my understanding that the interview will take approximately 30 minutes to complete.

4. With my agreement, the interview can be recorded. I have the right to request that the interview is not recorded.

5. I agree that information gathered for the study may be published provided that I cannot be identified as a participant. I also understand that while my interview will be recorded, my anonymity will be assured, as it is not necessary to record my name or any other identifying information in this recording.

6. I understand that all research data will be securely stored at the School of Psychology, University of Tasmania in a secure location for a period of five years and that the recordings and the data will be destroyed at the end of five years.

7. I understand that no psychological distress or inconvenience beyond the normal experience of everyday life is expected.

8. Any questions that I have asked have been answered to my satisfaction.

9. I agree to participate in the interview session and understand that my participation is voluntary, that **I may withdraw at any time and withdraw any information/data supplied to date** without being penalised or disadvantaged in any way.

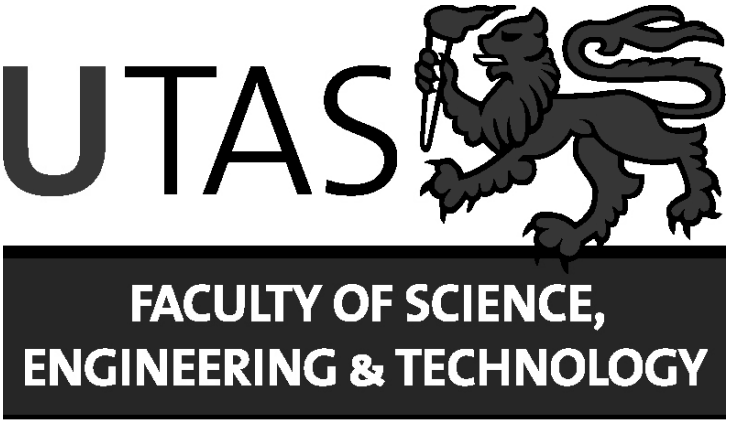
I am happy to have the interview tape recorded: Yes No

Name of participant:...……..…..(please print)

Signature of participant:…… Date:……..

Contact Number:…….Preferred time to call (Date/time)…….

NB: Between 50 and 70 telephone interview will be conducted during the 2009/10 bushfire season. If you indicate that you would like to be interview, but are not, this may be due to the large number of people interested in being interviewed. If however, you have a strong desire to discuss bushfire preparedness issues, please do not hesitate to contact me, either by phone or email (Ph: 6226 7462; Email: Mai.Frandsen@utas.edu.au); I would be very happy to hear from you.



School of Psychology

http://fcms.its.utas.edu.au/scieng/psychol/

http://www.bushfirecrc.com/

For more information about preparing your property for the bushfire season, contact the Tasmania Fire Service

Toll free – 1800 000 699

www.fire.tas.gov.au

Please refer to included compact disc (CD) for Appendices B to R